BEFORE THE

ROYAL COMMISSION ON ENERGY

CANADA

Submission of

Westcoast Transmission Company Limited

FEBRUARY 1958

WESTCOAST TRANSMISSION COMPANY LIMITED
PACIFIC BUILDING
CALGARY, ALBERTA

ROYAL COMMISSION ON ENERGY

Submission by

WESTCOAST TRANSMISSION COMPANY LIMITED

INTRODUCTION

The following submission is presented by Westcoast Transmission Company Limited in the first phase of the inquiry to be conducted by the Commission with respect to the oil and gas industry.

It is the intention of Westcoast to present a further submission to the Commission when the Commission is prepared to hear evidence with respect to the regulation of natural gas transmission, taxation, and related subjects.

It is assumed also that the general competitive factors with respect to the present sale and prospective future sales of natural gas as related to the production of petroleum, coal, manufactured gas, and natural gas liquids, will be dealt with in general terms in the Canadian Petroleum Association submission. The comment of Westcoast on the above factors will be related only to the situation as it is deemed to have a bearing on the sale of gas to be transmitted through the Westcoast system as constructed and projected.

However, Westcoast would like to reserve the right to present a supplementary submission dealing with the matters above enumerated which may not be dealt with by the Canadian Petroleum Association, or if in the opinion of Westcoast additional information in respect thereof would be of value to the Commission.

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APPENDIX

1

THE NATIONAL INTEREST IN NATURAL GAS

Natural gas is of national interest because rapidly expanding discoveries have provided supplies of this ideal fuel which already exceed any foreseeable needs of consumers in Canada. Gas has now become one of the important exportable natural resources which, if governed by sound national policies, will accelerate the economic growth and contribute in a large measure to the welfare of Canada.

The determination of a national policy in respect of the natural gas industry involves a study of three major phases, namely:—

1. SUPPLY, based on reserves, production and processing of gas.
2. TRANSMISSION, based on the economics of long distance pipelines.
3. MARKETS, based on population, industrial requirements, and the effect of competitive fuels.

These factors are all affected by the problem common to the development of other natural resources in Canada, namely, cost of transportation from the source of supply in one section of Canada to the major areas of consumption, such as Toronto and Montreal some 1,800 to 2,200 miles away from the established gas reserves, and to markets outside of Canada.

URGENCY OF A NATIONAL POLICY

In the early days of gas development in the provinces of Alberta and British Columbia, the national policy with respect to gas was determined having regard to the fact that the known reserves of gas were small in volume and the economical construction and operation of long distance pipelines was questionable. In latter years, however, there has been unprecedented increase in reserves through increasing discoveries in Alberta and in northeastern British Columbia, and the demands of large new markets assure the economical construction and operation of long distance pipelines. National policy can now be determined on a basis that will assure the development of a natural gas industry serving Canadian consumers and providing for the export of surplus gas.

It is clear to the management of Westcoast Transmission Company Limited (Westcoast) that the oil and gas industry in Canada is approaching a fork in the road. The direction it will take depends a great deal on some decisions that have to be made soon by this Commission and by the Government of Canada.

Westcoast submits that the natural gas reserves of Canada far exceed the requirements of Canadian consumers and, for the benefit of Canada, its industries and its trading position generally, markets presently available must be secured for surplus Canadian gas. These additional markets are in the United States.

There is a real danger that lack of decision with respect to the marketing of the surplus gas at an early date will cost Canada a permanent loss of some of its more lucrative potential markets for natural gas. It appears certain that if potential United States markets now available to Canadian supplies of gas are not placed under contract with assurances of reasonable supplies over a term of years, these markets will be lost.

Such markets, if not acquired at this time, can be supplied by gas produced in the United States, permitting Canadian gas to enter United States markets only years hence. It can very well be that at such time, if history is to be repeated, other fuels will have been developed which could render Canadian gas superfluous and as useless to Canada as the present coal resources of Alberta.

An immediate effect of the lack of decision on the development of the natural gas industry in Canada is that thousands of Canadians, who have been employed during the course of the last five years in the exploration and development phases of the natural gas industry, will be deprived of a livelihood and forced to await the development in Western Canada of some other industry with equal employment possibilities. Each gas drilling rig in operation employs about 20 men in the drilling crew. However, each drilling crew in operation is only part of the number of people employed in natural gas development. There are the geological and exploration crews. There are the transportation employees. There are the equipment and supply company, machine shop and other service employees engaged in maintaining each drilling rig with equipment and supplies now being increasingly provided from Canadian sources. If gas exploration and development programs are retarded or abandoned, many more Canadians will be affected than the few directly engaged in field work.

Unless there is a possibility of gas export, there is no incentive for companies engaged in the exploration for oil to drill gas wells. At the present time when producers make a gas discovery they cap the well and walk away from the area, as a gas well is a greater liability than a dry hole inasmuch as it cannot be abandoned. On each occasion in the past that there has been a prospect for the sale of natural gas, producers increased their exploration effort and proceeded to the drilling of second or third wells following up a discovery in order to evaluate the gas they might have for sale. It is submitted that if gas export is prohibited or unduly delayed, efforts to establish gas reserves by step-out drilling will be abandoned with consequent economic loss of gas which might be utilized as a natural resource.

It should be realized that the gas industry, which will be developed under a national policy favorable to gas export, will provide employment, not merely during initial stages but for years to come. The fact that there will be substantial growing demand for gas will serve as a basis for

continuous exploration and development programs. This work will maintain steady employment for exploration and development employees. Continued development of reserves will require continued building of plant facilities as well as continued building of field and long distance transmission pipelines. Increasing volumes of by-products will be made available upon which to base local industries thereby providing permanent employment in the vicinity of the gas fields. It is developments such as the foregoing which are in the minds of the officials of Westcoast when they advocate a national policy favorable to the export of gas.

Westcoast as a pioneer in the long distance transmission of gas in Canada has made a continuing study of the current and prospective supplies of gas and markets in the west.

In 1951 it was apparent to the management of Westcoast that the proper and reasonable method of supplying natural gas markets in Canada, other than British Columbia, was based upon allocating a supply of gas to meet Alberta's future requirements, and dedicating surplus reserves in southern and central Alberta to the markets which could economically be reached in Eastern Canada. At the same time Westcoast contended that the reserves of gas in the Peace River area of northwestern Alberta and northeastern British Columbia were ideally located to supply consumers in the interior of British Columbia and the Lower Mainland area, with a surplus available to supply part of the gas demands of the consumers in the Pacific Coastal States, whose large volume markets serve to bear the greater proportion of transmission costs.

The policy so advocated by the management of Westcoast was adopted by the Canadian authorities in authorizing the construction of the Westcoast project from the Peace River area through British Columbia, and also authorizing the construction of the Trans-Canada pipeline from Alberta to Ontario and Quebec.

The result of this policy is that the Westcoast system, which was first envisioned by Mr. Frank McMahon in 1935 and is today controlled and operated by Canadians, is Canada's first major natural gas pipeline. It was built without the benefit of any subsidy or cost to the people of Canada and it is providing a vital outlet for northern reserves, it is creating new industries for Western Canada, and new sources of revenue for Canada.

The importation of gas from Canada into the United States is subject to regulation under the Natural Gas Act of the United States. This regulation is carried out by the Federal Power Commission by virtue of its authority over the interstate gas pipeline companies. In those instances where the importation of gas into the United States has not created controversy between competing gas pipeline companies in the United States the Federal Power Commission has acted promptly in authorizing the importation of gas consistent with the interests of United States consumers. It has only been in those instances where the proposed importation of gas from Canada into the United States has been based upon the importing companies supplying gas in competition with existing pipeline companies serving the market area that delays have ensued in obtaining import authorizations. This situation occurred in the case of the Westcoast Transmission Company, Inc. attempting to serve a market which a competitive United States pipieline corporation was able to supply from United States sources. This situation prevails in the case of Midwestern Gas Transmission Company advocating the importation of gas from the Trans-Canada Pipe Line system for distribution in the market area served by Northern Natural Gas Company, Peoples Gas Light and Coke Company and the Michigan-Wisconsin Pipeline Company. (This statement is not intended as a comment on the merits of this latter contested proceeding but is submitted as a statement of fact).

BENEFITS FROM WESTCOAST PIPELINE

On October 1,1957, the Westcoast pipeline commenced the delivery of Peace River gas to the British Columbia Electric Company Limited for service in the City of Vancouver, and to Inland Natural Gas Co. Ltd. for service to almost all interior communities in British Columbia. By January 1958, the pipeline was transmitting some 290 million cubic feet of gas per day. This is being increased daily so that the line will be delivering in excess of 300 million cubic feet of gas daily during the balance of the winter season 1958.

The completion of the Westcoast pipeline project has added a new industry to the economy of Western Canada. Seven years ago, when Pacific Petroleums Ltd. (Pacific Petroleums) one of the sponsors of Westcoast, first started major operations in the Peace River area, the economy of the area was solely agricultural. The village of Fort St. John had a population of about 800; Grande Prairie about 2,600; and Dawson Creek about 3,500. Fuel was supplied by expensive coal, oil and wood. Westcoast first piped gas to Dawson Creek and then to Grande Prairie and the villages en route. Now, all of these communities enjoy the economy and convenience of natural gas.

For the past two years Westcoast has employed more than 2,000 men in the construction of its pipeline. In addition, Westcoast, Pacific Petroleums, Phillips Petroleum Company and Jefferson Lake Sulphur Company employed more than 800 men at Taylor, British Columbia, in the construction of the Gas Scrubbing Plant, Refinery and Sulphur Plant at Taylor. Pacific Petroleums and its associates have spent approximately 37 million dollars in the exploration and development of gas in the Peace River area. Prior to the exploration program of Pacific Petroleums there were only two or three drilling rigs working in the area. Following the granting of the export permit by the Alberta Conservation Board in 1952, activity in the area has continuously increased and in 1956 and 1957 a high in activity was reached with 36 rigs working in the Peace River area.

The operation of the pipeline itself provides employment for more than 300, the processing plants have an operating force of about 135 people; and about 200 people are employed in gas field operations. The Refinery will manufacture about half of the motor gasoline requirements for the Peace River area and its propane production will materially assist in alleviating any propane shortage in Western Canada. The Sulphur Plant will produce enough sulphur to supply all of the pulp and paper mills and other industries in British Columbia.

The economic benefits of the Westcoast project to the Peace River area and British Columbia are apparent. The population of Fort St. John has quintupled to 4,000 and the population of Grande Prairie and of Dawson Creek has doubled to 6,000 and 7,500 respectively. Essentially 100% of the domestic, commercial and industrial requirements for fuel in these areas are now supplied by low cost gas. The interior communities of British Columbia are now supplied with gas, including the communities in the Okanagan Valley and Trail-Nelson areas. It is interesting to note that the volumes required for Vancouver in January, 1958, have reached the market demands originally estimated for the fifth year of operation, namely 1961.

As a result of the market facilities provided by the Westcoast pipeline, there will not be a large economic loss from the flaring and wasting of natural gas incidental to the production of oil in the Peace River area. This area can be the first major oil area developed in Canada which will have an outlet for gas in the development years of oil field operation. There will not be the

tremendous economic waste which has occurred in Alberta from the production, along with oil, of billions of cubic feet of gas from Turner Valley, Redwater, Leduc, Pembina, and other oil fields prior to the provision of market outlets for this gas.

In addition, since there is a market for any gas discovered, there will be a more intensified search for both oil and gas, because exploration costs can be recovered from two possible sources of revenue.

Since Westcoast, a Canadian company, managed by Canadians, demonstrated it could obtain in the money markets of America some $200,000,000 for investment in a gas pipeline serving new fields and new markets, the attention of engineers, investors, and developers of natural resources has been attracted to a northern area as never before in Canada's history.

There are constant demonstrations of this additional interest, as evidenced by the extensive preliminary engineering investigations being carried on by various groups in the minerals, timber and other resources of northern British Columbia and in the potential power development on the Peace River. There has been renewed interest in a north-south railway to Alaska. The opening up for settlement of additional areas of farm lands in the northern areas of both Alberta and British Columbia has been accelerated.

The construction of the Westcoast pipeline project has given encouragement to the Province of British Columbia in making its decision to extend the Pacific Great Eastern Railway into the Peace River area. The prospective shipment of sulphur and hydrocarbon by-products extracted from the gas transmitted by the Westcoast pipeline provided the potential revenue required to make the railway possible. This railway will provide, for the first time, direct rail access to the Pacific Coast for the grain, cattle and other products of the area. Further, because of the availability of gas, the British Columbia Power Commission has been supplied with gas for fuel in its power installations throughout the interior of British Columbia. This supply of fuel at a lower cost than that of other fuels available makes it possible for the Power Commission to extend its service throughout the interior of British Columbia, including its rural electrification programs.

It is only by opening up the northern areas in like manner that Canada can realize her full potential as a nation.

It is pointed out, however, that export of the gas from these northern regions is essential if development is to proceed. The Westcoast pipeline now in operation, was made possible because there was a market in the United States for a sufficient volume of gas to justify the financing and construction of the pipeline. The export volumes of gas must be transmitted with the volumes of gas required to serve markets in British Columbia in order to permit the sale of the gas in the British Columbia markets at an economic price.

EXPORT MARKET FOR NATURAL GAS

Every consideration of discovery trends in the search for oil and gas pointed to the fact further exportable volumes of gas would be made available in increasing volumes in the Peace River area and elsewhere in Alberta. Accordingly, having provided under contract with the distributing companies in British Columbia for all their foreseeable requirements of gas, Westcoast officials looked to the United States for markets for additional supplies of gas from Canada surplus to

Canadian requirements. Conversations with the distributors of gas in the Pacific Coastal States disclosed that there was a ready market in the area served by them for much larger volumes of gas from Western Canada.

There are other sources, however, from which gas required in the Pacific Coastal markets may be supplied, namely, Texas, New Mexico, Colorado, and the Mountain States. Westcoast, therefore, entered into a contract to deliver additional gas to the Pacific Northwest Pipeline Corporation (Pacific Northwest) at Huntingdon, British Columbia, through its Peace River pipeline facilities. At the same time Westcoast entered into a contract to supply a portion of the gas required by the Pacific Northwest system through a pipeline to be constructed by Westcoast from southern Alberta through southeastern British Columbia to the International Border near Kingsgate, British Columbia, northeast of Spokane, Washington. Pacific Northwest in turn agreed to construct a pipeline from Spokane to Kingsgate. The Pacific Northwest Pipeline is connected with the El Paso Natural Gas Company (El Paso) system. El Paso proposes to build facilities connecting with the Pacific Northwest pipeline so as to make the gas from Canada available to consumers in the State of California. The above contracts in each instance are subject to each party receiving all governmental authorizations required to implement them.

As in the case of export of gas from the Peace River area, the Westcoast proposal for export of gas from southern Alberta is to purchase for export and deliver to the United States customer only such volumes of gas as are clearly surplus to the requirements of Alberta, British Columbia and eastern Canadian markets. The volumes proposed to be exported, as applied for under the provisions of The Gas Resources Preservation Act of the Province of Alberta, are sufficient to meet the immediate requirements of the United States customer, make the project economic, and yet not prejudice in any way the future supplies of gas for the Canadian consumers either in Alberta, British Columbia or the eastern provinces.

This proposal by Westcoast is not contrary to the policy of allocating gas reserves between eastern and western markets advocated by Westcoast in 1952 and 1953, but is in fact supplementary thereto. The gas reserves discovered and available for production in the province of Alberta now far exceed any estimates deemed reasonable in 1952. The study, subsequently described in this submission, of the economics of gathering and distributing gas within the province of Alberta to supply, first, the requirements of Alberta consumers and, secondly, the export markets clearly establishes that limited export of gas from southern Alberta to the United States markets is a necessity:—

(i) for the maintenance of an orderly development of the natural gas industry in western Canada, and

(ii) to prevent the waste of oil field gas, and

(iii) to provide an economic basis for financing and operating the processing plants required to recover hydrocarbons and sulphur from wet and sour gas areas.

GAS RESERVES

In the following section of this submission there is set out the estimate of gas reserves in Alberta and British Columbia compiled by the engineering and geological staff of Westcoast.

This estimate of gas reserves in the Provinces of Alberta and British Columbia may be summarized as follows:—

Recoverable pipeline gas:	24.5 trillion cubic feet
Future potential reserves:	170 to 300 trillion cubic feet

CONCLUSION

It is respectfully submitted that in the factual data set out in the presentations made to it, the Commission will find ample evidence upon which to conclude that the export of natural gas to United States markets is essential to the national interest of Canada.

It is further submitted that the Commission can also find that the gas reserves will be vastly increased in the future by the incentive given to gas exploration and development with the opening up of the presently available United States markets for Canadian surplus gas.

The calm announcement by the United Kingdom in January, 1958, that it expects to have hydrogen power on a commercial basis by 1960 warns us that the days when natural gas will reign supreme as a source of fuel and energy cannot be expected to last forever. Already the first atomic energy electric generating plant is in California supplying part of the energy requirements of the principal western market for surplus Canadian gas.

There is a grave danger if the development of this natural resource is postponed indefinitely, that great volumes may be completely wasted and the gas industry will not have the opportunity to play the outstanding role in developing the economy of Canada that should rightfully belong to it.

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POTENTIAL GAS RESERVES OF ALBERTA AND BRITISH COLUMBIA

The gas producing areas of Alberta and British Columbia are situated in the Western Canada Sedimentary Basin described in the submission by the Canadian Petroleum Association as consisting of an area 800 miles wide at the International Boundary between Canada and the United States stretching from the Precambrian Shield in Manitoba on the east to the Cordillera on the west. Northwestward the area extends 1,600 miles up to the delta of the Mackenzie River. At the Arctic coast its width is about 250 miles.

The area is stated by Dr. George S. Hume, one of Canada's outstanding geologists, to comprise 712,000 square miles containing a volume of sediments with a thickness of 1,000 to 16,000 feet in depth, with a total volume of 950,000 cubic miles. The ultimate recoverable oil of this basin is estimated at 50 billion barrels and may be as large as 100 billion barrels. This is exclusive of the bituminous sands of northern Alberta.

With regard to the volume of ultimate recoverable gas in the same area, Dr. Hume stated the reserves of gas range from 170 trillion to 300 trillion cubic feet. His estimate of potential gas reserves is as follows:

> It has already been shown that a figure of 6 trillion cubic feet of gas is being found in the United States for each billion barrels of oil. In view of the prospects for gas, as already shown by discoveries, and in view of geological opinion, particularly in regard to foothills structures, this figure does not seem too high for Canada. Applied to the minimum figures of 28.5 billion to 47.5 billion barrels of oil, the minimum figures for possible gas reserves would be 170 to 285 trillion cubic feet for the Western Canadian sedimentary basin.
>
> Applied to the more reasonable figure of 50 billion barrels, it would be 300 trillion cubic feet. Even the higher figure of 300 trillion is slightly lower than one-quarter of what is being predicted for the ultimate figure in the United States where, in spite of a considerable greater density of drilling than in Canada, the finding of 24.9 trillion cubic feet of new natural gas reserves during 1956 constituted the largest single discovery year in the history of gas development in that country.
>
> It is also reported that "in the period 1951 - 1955 in the United States 82.5 trillion cubic feet of new natural gas reserves were proven to exist. In the preceding five-

year period covering 1946 - 1950 new gas found totaled 67.3 trillion cubic feet." This is a discovery of almost 150 trillion cubic feet in 10 years. This period corresponds to the decade in which there was a tremendous expansion of the natural gas industry in the United States, and in which the value of natural gas received greater recognition than had previously been the case.

There is no doubt, therefore, with proper incentives the natural gas industry of Western Canada can have a similar proportional expansion in the next decade, since it can be stated with a high degree of confidence that the ultimate amount of gas to be discovered in the Western Canadian basin is in the hundreds of trillions of cubic feet.

Of the total volume of sediments in Western Canada approximately 450,000 cubic miles are situated in the Provinces of Alberta and British Columbia. Accordingly having regard to the prospective productive capacity, which is much higher for Alberta and British Columbia than could be expected in Manitoba and Saskatchewan, at least one-half of the potential gas reserves are situated in the two Western Provinces. On this basis, the potential reserves of gas in Alberta and British Columbia are at the minimum, in the range of 85 to 150 trillion cubic feet.

3

THE TREND OF GAS DISCOVERIES IN SOUTHWESTERN ALBERTA

The engineering staff of Westcoast made an analysis of the trend of the discovery of reserves in the southern and central Alberta area from which Westcoast proposes to obtain its supplies of gas for additional export to the Pacific Coastal States. The area selected is contained within the hatched lines set out on the map on page 14. The intervals upon which the discovery trend is established were selected to correspond with the effective dates of the various reports of the Oil and Gas Conservation Board containing reserve estimates. A summary of the wildcat wells drilled in this area during these intervals are as follows:—

Internal	Number of Wildcat Wells
Prior to Jan. 1, 1951	183
Jan. 1, 1951 to Jan. 1, 1952	43
Jan. 1, 1952 to June 30, 1953	88
June 30, 1953 to March 31, 1954	67
March 31, 1954 to June 30, 1955	100
June 30, 1955 to Jan. 31, 1957	150

The graph on page 13 illustrates the discovery trend in initial disposable reserves per wildcat well drilled. The average reserves discovered per wildcat well drilled during these years was 10 billion cubic feet. The results plotted on a cumulative basis indicate the trend in initial cumulative disposable reserves discovered per cumulative number of wells drilled.

It is estimated that during the next 30 years an average of 100 wildcat wells per year will be drilled for the first 10 years, 75 wildcat wells per year will be drilled for the next succeeding 10 years, and 50 wildcat wells per year in the third 10-year period. On this basis the density of wildcats would be about 3 wells per township of approximately 23,000 acres.

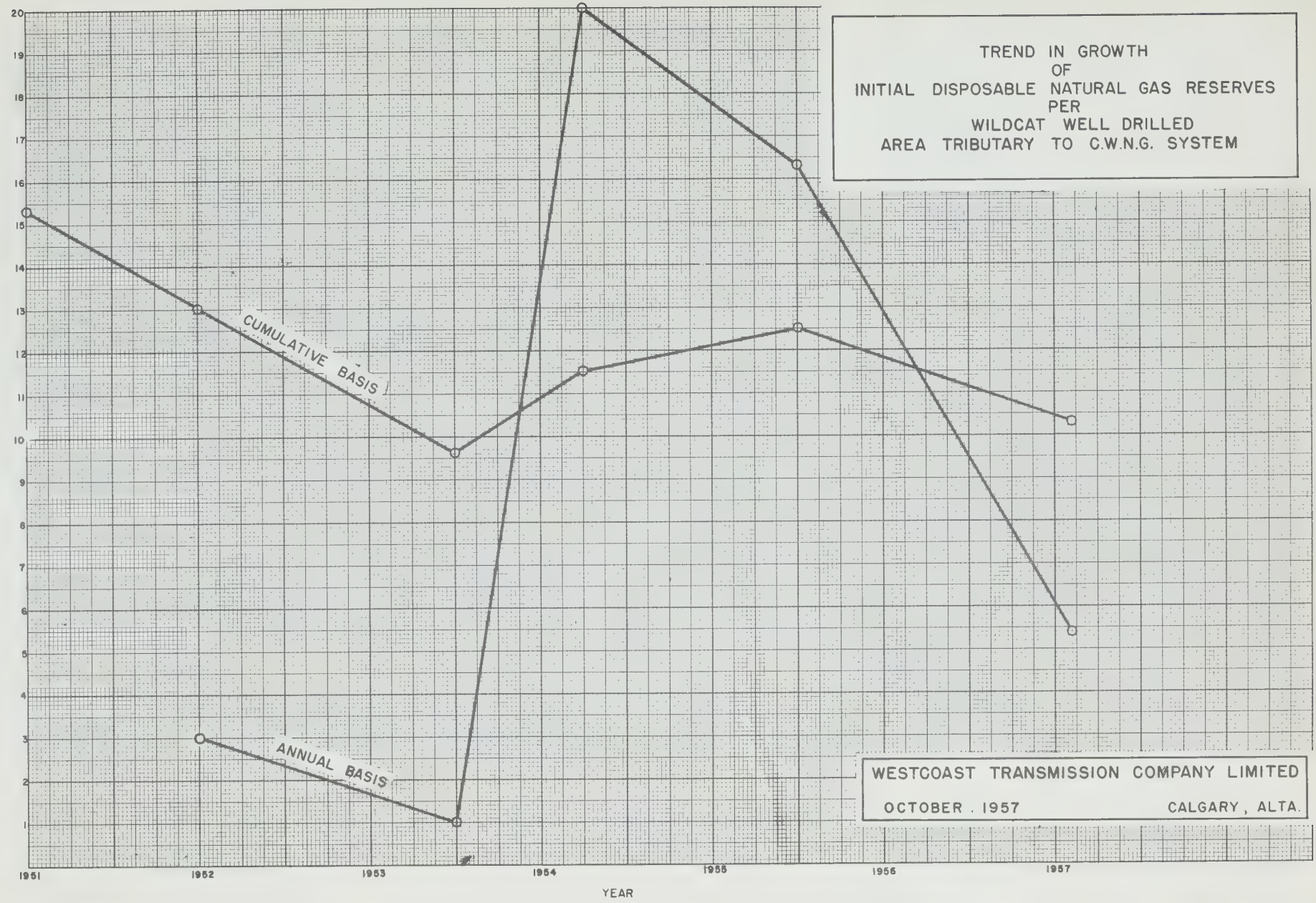
As illustrated on the graph, page 13, the cumulative discovery trend since June 1953 has varied from 9.5 to 12.5 billion cubic feet of gas per wildcat well. If during the next 30-year

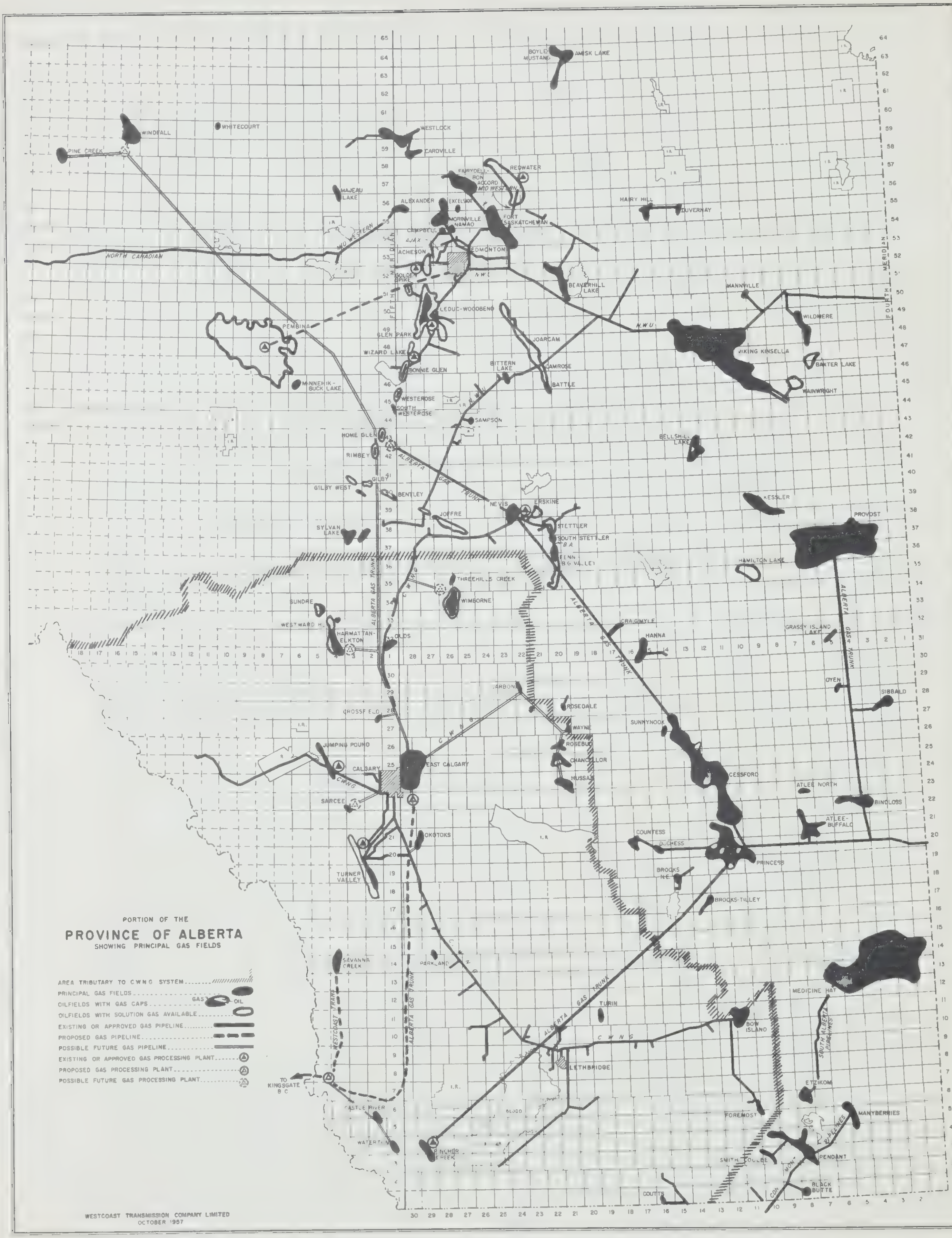
period an average of only 10 billion cubic feet of gas per well is discovered, the estimated total additional reserves discovered in this small area of Alberta would be 22.5 trillion cubic feet. This 22.5 trillion cubic feet is equivalent to the whole of the recoverable pipeline reserves in the Province of Alberta as estimated by Westcoast as of this date. It is submitted that this approach to estimating the potential reserves of the Province is corroborative of the overall approach to estimating potential reserves adopted by Dr. Hume in the reserve estimate submitted by the Canadian Petroleum Association.

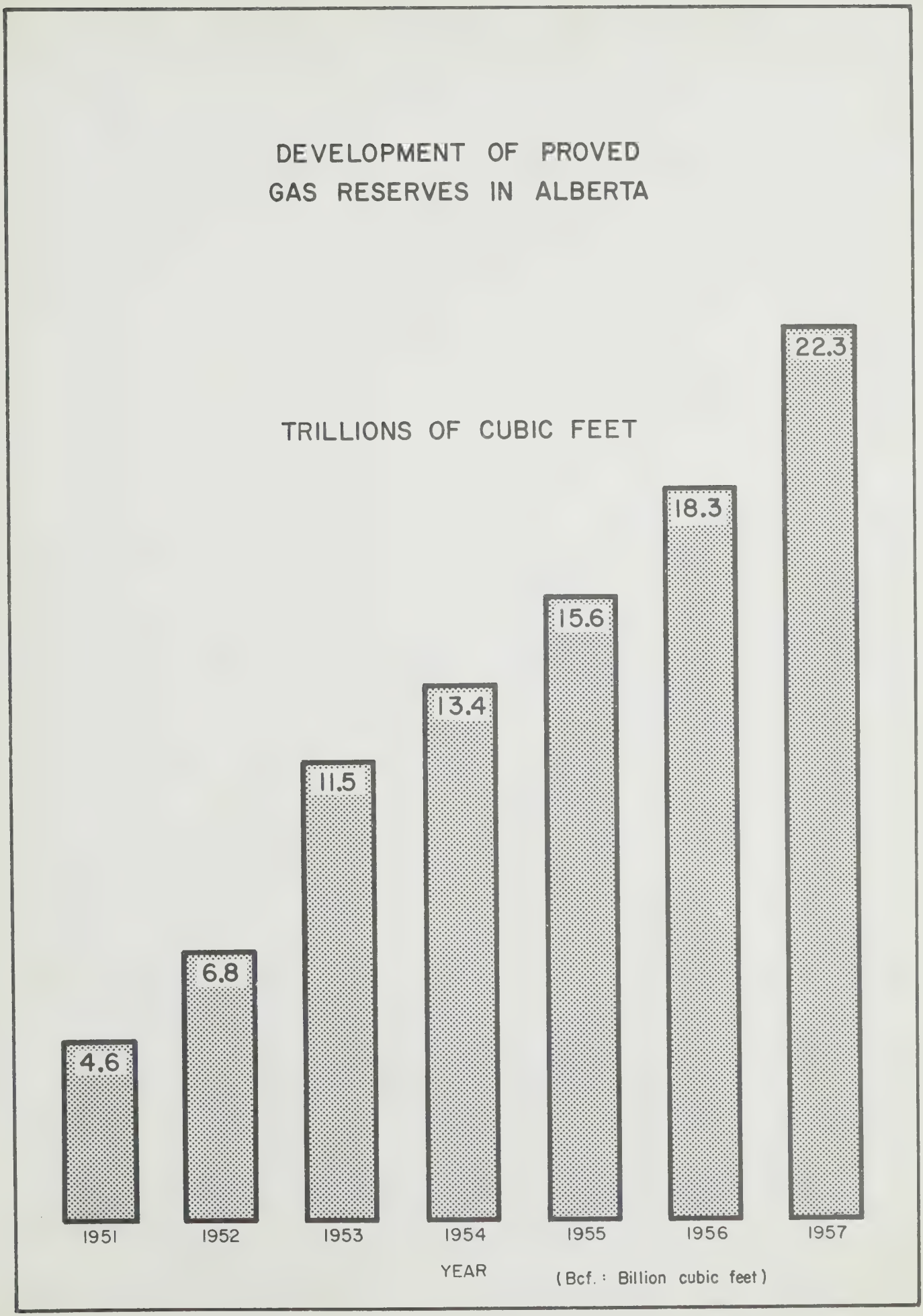
The chart on page 15 shows the increase in the reserves of gas in the Province of Alberta for the years 1951 to 1957 inclusive.

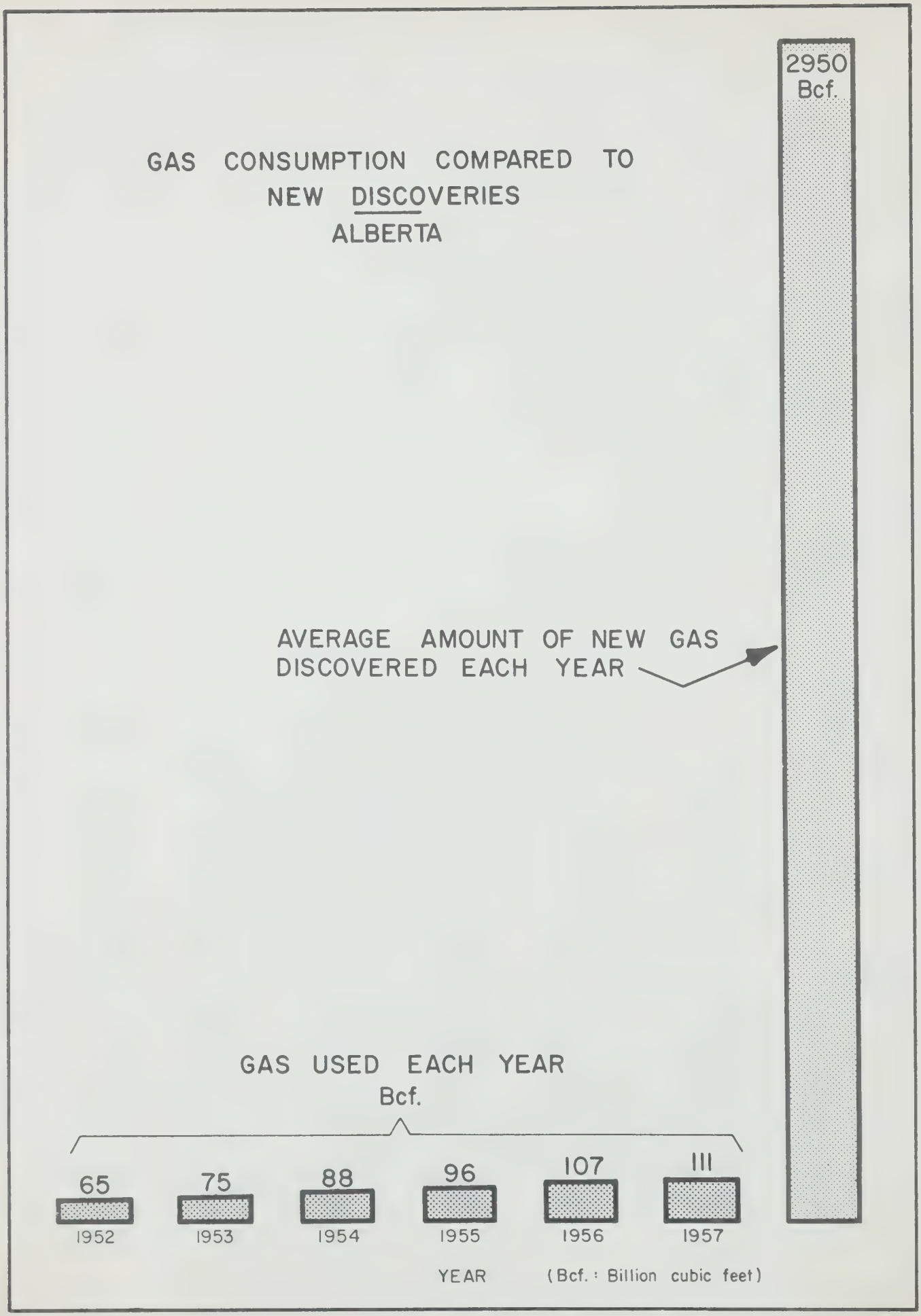
The chart on page 16 shows a comparison of the gas used each year in the Province of Alberta for the years 1952 to 1957 inclusive as contrasted with the average amount of additional gas reserves discovered in each year for the same period.

The chart on page 17 shows the percentage of the gas produced in Alberta in each of the years 1952 to 1957 inclusive divided into the volumes of gas used locally and for export, and gas wasted by flaring in the field.

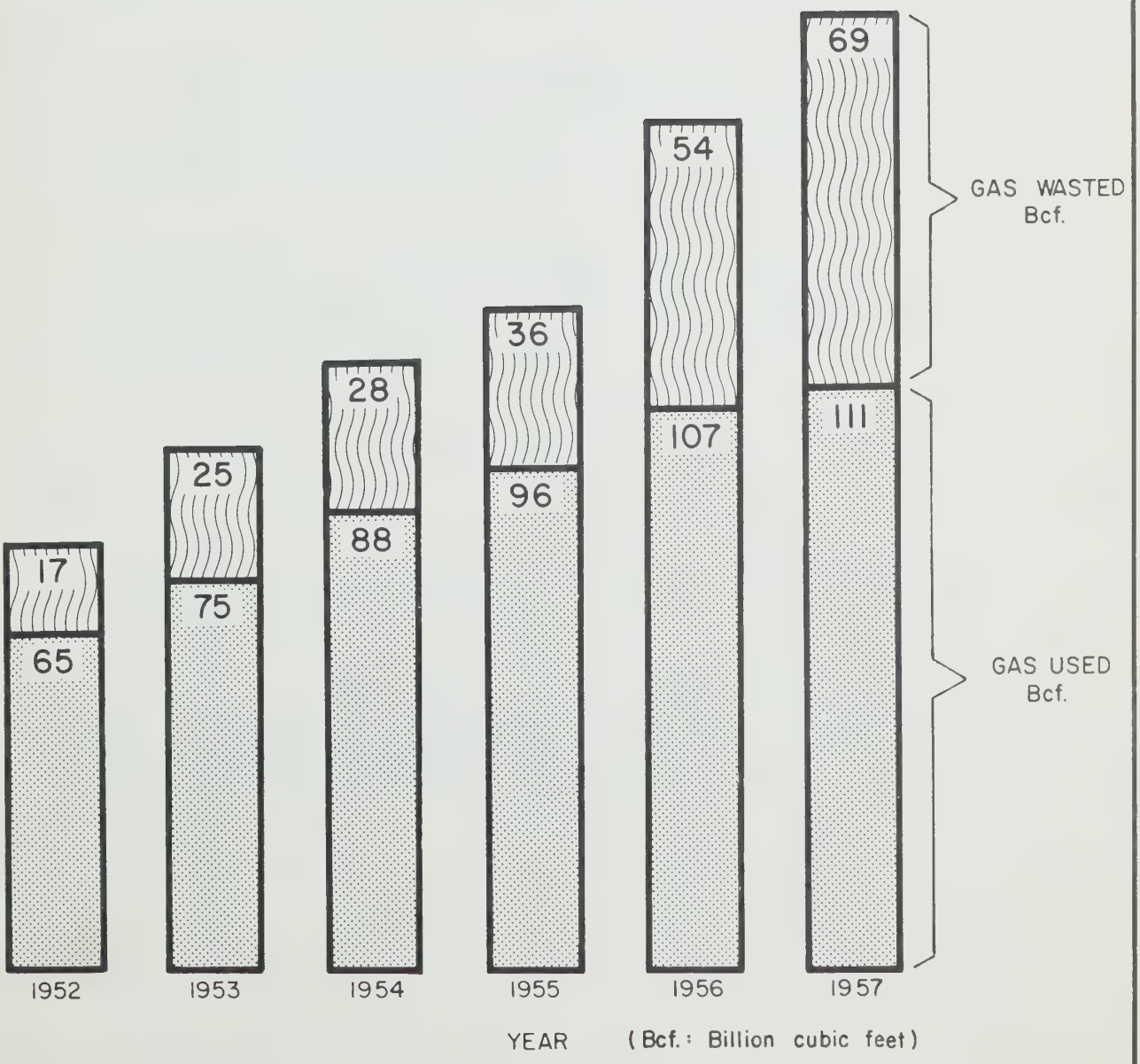

TREND IN GROWTH
OF
INITIAL DISPOSABLE NATURAL GAS RESERVES
PER
WILDCAT WELL DRILLED
AREA TRIBUTARY TO C.W.N.G. SYSTEM
Initial Disposable Reserves Per Wildcat Drilled — Bcf.
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
CUMULATIVE BASIS
ANNUAL BASIS
1951
1952
1953
1954
1955
1956
1957
YEAR
WESTCOAST TRANSMISSION COMPANY LIMITED
OCTOBER . 1957
CALGARY, ALTA.


PORTION OF THE
PROVINCE OF ALBERTA
SHOWING PRINCIPAL GAS FIELDS
AREA TRIBUTARY TO CWNG SYSTEM
PRINCIPAL GAS FIELDS
OILFIELDS WITH GAS CAPS
GAS
OIL
OILFIELDS WITH SOLUTION GAS AVAILABLE
EXISTING OR APPROVED GAS PIPELINE
PROPOSED GAS PIPELINE
POSSIBLE FUTURE GAS PIPELINE
EXISTING OR APPROVED GAS PROCESSING PLANT
PROPOSED GAS PROCESSING PLANT
POSSIBLE FUTURE GAS PROCESSING PLANT
WESTCOAST TRANSMISSION COMPANY LIMITED
OCTOBER 1957
FIFTH MERIDIAN
FOURTH MERIDIAN
NORTH CANADIAN
WINDFALL
PINE CREEK
WHITECOURT
WESTLOCK
CAROVILLE
BOYLE MUSTANG
AMISK LAKE
REDWATER
FAIRYDELL-BON ACCORD
MID WESTERN
MAJEAU LAKE
ALEXANDER
MORINVILLE
NAMAO
FORT SASKATCHEWAN
HAIRY HILL
DUVERNAY
CAMPBELL
ACHESON
EDMONTON
GOLDEN SPIKE
BEAVERHILL LAKE
MANNVILLE
WILDMERE
PEMBINA
LEDUC-WOODBEND
GLEN PARK
WIZARD LAKE
BONNIE GLEN
JOARCAM
BITTERN LAKE
CAMROSE
BATTLE
VIKING KINSELLA
BAXTER LAKE
WAINWRIGHT
MINNEHIK-BUCK LAKE
WESTEROSE
SOUTH WESTEROSE
SAMPSON
HOME GLEN
RIMBEY
BELLSHILL LAKE
ALBERTA GAS TRUNK
GILBY
GILBY WEST
BENTLEY
KESSLER
NEVIS
ERSKINE
JOFFRE
PROVOST
SYLVAN LAKE
STETTLER
SOUTH STETTLER
FENN BIG VALLEY
HAMILTON LAKE
THREEHILLS CREEK
WIMBORNE
SUNDRE
WESTWARD H.
HARMATTAN-ELKTON
OLDS
CRAIGMYLE
HANNA
GRASSY ISLAND LAKE
OYEN
SIBBALD
CARBON
ROSEDALE
CROSSFIELD
SUNNYNOOK
WAYNE
ROSEBUD
CHANCELLOR
HUSSAR
JUMPING POUND
CALGARY
EAST CALGARY
C W N G
SARCEE
CESSFORD
ATLEE NORTH
BINDLOSS
ATLEE-BUFFALO
OKOTOKS
COUNTESS
DUCHESS
PRINCESS
TURNER VALLEY
BROOKS N.E.
BROOKS-TILLEY
SAVANNA CREEK
PARKLAND
MEDICINE HAT
WESTCOAST TRANS
TURIN
BOW ISLAND
SOUTH ALBERTA PIPELINES
LETHBRIDGE
TO KINGSGATE B.C.
ETZIKOM
CASTLE RIVER
FOREMOST
MANYBERRIES
WATERTON
PINCHER CREEK
SMITH COULEE
PENDANT
BLACK BUTTE
COUTTS
BLOOD
I.R.


DEVELOPMENT OF PROVED
GAS RESERVES IN ALBERTA
TRILLIONS OF CUBIC FEET
4.6
6.8
11.5
13.4
15.6
18.3
22.3
1951
1952
1953
1954
1955
1956
1957
YEAR
(Bcf. : Billion cubic feet)


GAS CONSUMPTION COMPARED TO
NEW DISCOVERIES
ALBERTA
2950
Bcf.
AVERAGE AMOUNT OF NEW GAS
DISCOVERED EACH YEAR
GAS USED EACH YEAR
Bcf.
65
75
88
96
107
111
1952
1953
1954
1955
1956
1957
YEAR
(Bcf. = Billion cubic feet)

GAS CONSUMPTION COMPARED TO GAS WASTED
ALBERTA



4

RECOVERABLE PIPELINE GAS RESERVES IN ALBERTA AND BRITISH COLUMBIA

Basically, gas reserves are determined by two methods: —

(a) the volumetric method which is the only applicable method for new gas fields in which volume of pore space within a reservoir rock available for containing gas is estimated, and

(b) the pressure decline method applicable to established producing fields in which the decline in pressure is related to the volume of gas removed and therefrom the ultimate available recoverable gas estimated.

With the exception of the Viking-Kinsella field near Edmonton and the Turner Valley field near Calgary, and a few smaller fields, all estimates for other fields must be based on the volumetric method inasmuch as the fields are new and there is insufficient production history from which a pressure decline determination can be made.

Since the volumetric method requires an estimate of the volume of pore space within reservoir rock available to contain natural gas, the estimate of necessity must be based upon expert opinion, giving consideration to all of the available factors.

In the Docket G-580-Natural Gas Investigation conducted by the Federal Power Commission of the United States from 1945 to 1948, the Commissioners Smith and Wimberly in writing their report referred to the estimating of gas reserves as follows: —

> "Estimating the volume of gas reserves, rather than being an exact science, requires the application of trained judgment to limited fundamental knowledge of underlying conditions. In a consideration of reserve estimates it is well to appreciate the many variable factors which have affected their determination.

"There may be variations not only in procedures and degree of judgment exercised, but there may also exist considerable differences in the standards of reporting.

"Usually estimates are made of 'proved' reserves only. This term, as previously noted, is not subject to precise definition, for an area is never entirely proved until it has been completely developed. However, sufficient knowledge of the formation and the limits of the structure may be obtained before a field has been fully drilled, to provide the basis for a reasonable estimate of the volume of gas recoverable. Particularly in new fields, there exist for the estimator difficult problems in determining the limits of the reservoir.

"Conditions may indicate that a field extends beyond the points for which available data will firmly support. In such areas, reserves may be classified less definitely, as probable but not proved. Thus, there is considerable latitude in designating reserves as proved or probable; much depends upon the good judgment of the estimator."

The estimate presented to the Commission by the Canadian Petroleum Association following the pattern of estimating of gas reserves adopted by the American Gas Association and the American Petroleum Institute over a period of some years, is a conservative estimate comprised of individual companies' or producers' estimates furnished to the Association for the purpose of providing the Association with statistical data useful for the evaluation of reserves for comparative purposes and to illustrate the trend of decreasing or increasing gas reserves from year to year.

The intent in such estimates is to make the calculation of reserves consistent from year to year and generally to include as proved only the estimated volumes of gas underlying wells already drilled with little consideration to the areas in the vicinity of the drilled wells. Such areas are generally not classed as proved but as probable, so as to give effect to a minimum conservative estimate for proved areas, particularly in respect to individual new well discoveries.

The conservative nature of this statistical estimate is illustrated in the fact that in succeeding years the major increase in additions to proved reserves of oil and gas added each year are due to re-valuing and increasing the estimates of reserves from discoveries of previous years following further drilling and study of the data on which the initial estimates were made.

The reserve estimates provided, often in confidence, to such Associations for the above mentioned statistical purposes are not relied upon by the natural gas industry as estimates upon which the financing, development and operation of specific projects are carried out. In each case in which there is a prospect for the expenditure of substantial sums in development drilling, pipeline and plant capacity, it is the custom in the natural gas industry to have specific estimates of the reserves carried out by recognized geological and engineering consultants who have had years of experience and who have had the opportunity to study the results of natural gas production from many fields.

These consultants give consideration to all of the available information and do not necessarily limit the productive acreage to drilled areas but include in their proved reserve estimates areas de-

fined by geologic interpretation based on sub-surface and other information interpreted on the basis of the experience of the consultant in each case. It is the estimates of proved gas reserves prepared by such consultants that have provided the basis for investment in pipeline and plant facilities by insurance companies and other large scale investors for many years.

After specific studies of the nature referred to above, the geological and engineering staff of Westcoast have estimated the proved reserves of gas in Alberta and British Columbia for the purposes of operations of the Westcoast project and for the purpose of providing a basis for the investment of funds in the proposed Westcoast pipeline from southern Alberta to Kingsgate, British Columbia. This estimate is summarized as follows: —

	Recoverable Pipeline Reserves MMcf
Alberta	22,300
British Columbia	2,200

The map on page 14 shows the location of the principal gas fields in Alberta. The gas reserve within these fields has been allocated in the table starting on page 22 on the basis of location and economics to supply local requirements, the various export pipelines and the proposed Westcoast export of gas from southern and central Alberta.

On the last page of the tables the gas reserve available for each use is totalled for all fields. The gas requirements and the requirements for gas as a percent of the available supply is also shown. The estimated reserves as detailed in the table are one and one-third the total requirements for local use in the next thirty years, for the authorized pipelines including additional gas for the Trans-Canada Pipe Line system in the volume of 2.75 trillion cubic feet and the estimated requirements of the proposed Westcoast pipeline to Kingsgate, British Columbia.

ESTABLISHED RESERVES OF NATURAL GAS IN ALBERTA

Revised
January, 1958

ALLOCATION TO LOGICAL USES

Volumes in BCF at 14.4 psia and 60° F.

Proved Disposable Gas By Areas - Bcf

Field	Canadian Western Area	Northwestern Utilities Area	Medicine Hat Area	Local Areas	Peace River Area	Available or Authorized for Montana	Available or Authorized for Trans-Canada	Requested by Westcoast	Uneconomic	Total	Source of Reserve Estimate
Acheson		92.6								92.6	Board
Alexander		30.0								30.0	Board
Alhambra									10.0	10.0	Board
Ashmont				10.0						10.0	Board
Athabaska				3.6						3.6	Board
Athabaska, East				1.2						1.2	Board
Atlee - Buffalo							140.0			140.0	Board
Beaver Creek									20.0	20.0	Board
Beaver Hill Lake		50.0								50.0	Board
Belloy					75.0					75.0	Board
Bellshill Lake									42.0	42.0	Board
Bindloss							200.0			200.00	Board
Bittem Lake		26.0								26.0	Board
Black Butte						32.2				32.2	Board
Bolloque Lake									12.0	12.0	Board
Bonnie Glen		652.0								652.0	Board
Bonnyville				3.4						3.4	Board
Bow Island	16.0									16.0	Board
Boyle - Amisk Lake									20.0	20.0	Board
Braebum					52.0					52.0	Board
Braeburn West					17.0					17.0	Board
Brooks Northeast				9.8						9.8	Board
Brooks - Tilley				29.0						29.0	Board
Burnt River					10.0					10.0	Board
Calgary	24.2							651.5		675.7	Westcoast
Campbell - Namao		40.0								40.0	Board
Carbon	250.5									250.5	Westcoast
Castor				20.0						20.0	Board
Cessford							1070.0			1070.0	Board
Chancellor							29.0			29.0	Board

Proved Disposable Gas By Areas - Bcf

Field	Canadian Western Area	Northwestern Utilities Area	Medicine Hat Area	Local Areas	Peace River Area	Available or Authorized for Montana	Available or Authorized for Trans-Canada	Requested by Westcoast	Uneconomic	Total	Source of Reserve Estimate
Chigwell									15.0	15.0	Board
Chinook Ridge									45.0	45.0	Board
Clive									16.0	16.0	Board
Cold Lake				1.0						1.0	Board
Comrey						45.0				45.0	Board
Connorsville							18.0			18.0	Board
Control	20.0									20.0	Board
Countess							54.0			54.0	Board
Crossfield	228.0									228.0	Westcoast
Dixonville					27.0					27.0	Board
Donalda									10.0	10.0	Board
Duchess							19.0			19.0	Board
Duhamel		11.0								11.0	Board
Duvernay				1.0						1.0	Board
Dyberg		14.0								14.0	Board
Eagle Hill	139.0									139.0	Sproule
Eaglesham					16.0					16.0	Board
Elk Point				0.6						0.6	Board
Erskine	47.0									47.0	Board
Etzikom			126.0							126.0	Board
Excelsior		34.0								34.0	Board
Eyremore									15.0	15.0	Board
Fairydell -Bon Accord		98.0								98.0	Board
Fenn - Big Valley	90.0									90.0	Board
Foremost	21.0									21.0	Board
Fort Saskatchewan		120.0								120.0	Board
Garrington	25.0									25.0	Board
Gem							11.0			11.0	Board
Ghost Pine									15.0	15.0	Board
Gilby							196.0			196.0	Board
Golden Spike		110.0								110.0	Board
Goodwin Lake		29.0								29.0	Board
Gordondale					157.6					157.6	Westcoast
Grassy Island							20.0			20.0	Board
Hackett	45.0									45.0	Board

Proved Disposable Gas By Areas - Bcf

Field	Canadian Western Area	Northwestern Utilities Area	Medicine Hat Area	Local Areas	Peace River Area	or Authorized for Montana Available	Available or Authorized for Trans-Canada	Requested by Westcoast	Uneconomic	Total	Source of Reserve Estimate
Hairy Hill				13.0						13.0	Board
Hamelin Creek					45.0					45.0	Board
Hamilton Lake							40.0			40.0	Board
Hanna - Watts				10.3						10.3	Board
Harmattan-Elkton	1137.8									1137.8	Sproule
Hercules		19.0								19.0	Board
Homeglen-Rimbey							850.0			850.0	Board
Hussar							105.0			105.0	Board
Joarcam		50.0								50.0	Board
Jumping Pound	516.0									516.0	Board
Kessler							50.0			50.0	Board
Kevisville	10.0									10.0	Board
Lac La Biche									40.0	40.0	Board
Leahurst				7.7						7.7	Board
Leduc-Woodbend		658.3								658.3	Board
Lindbergh				3.5						3.5	Board
Little Smoky					14.0					14.0	Board
Lloydminster				6.1						6.1	Board
Majeau Lake									12.0	12.0	Board
Malmo		17.0								17.0	Board
Manyberries						65.0				65.0	Board
Medicine Hat			1030.0							1030.0	Board
Minnehik-Buck Lake		281.9								281.9	Westcoast
Morinville		102.0								102.0	Board
Mountain Park									25.0	25.0	Board
Nevis							510.0			510.0	Board
New Norway		10.0								10.0	Board
Normandville									25.0	25.0	Board
Obed									10.0	10.0	Board
Oberlin				1.1						1.1	Board
Okotoks	135.0									135.0	Board
Olds	70.0									70.0	Board
Oyen							8.0			8.0	Board
Parkland									15.0	15.0	Board
Pembina		705.0								705.0	Board

Proved Disposable Gas By Areas - Bcf

Field	Canadian Western Area	Northwestern Utilities Area	Medicine Hat Area	Local Areas	Peace River Area	Available or Authorized for Montana	Available or Authorized for Trans-Canada	Requested by Westcoast	Uneconomic	Total	Source of Reserve Estimate
Pendant d'Oreille						145.0				145.0	Board
Phil Can									13.0	13.0	Board
Pigeon Lake		10.0								10.0	Board
Pincher Creek							1800.0			1800.0	Board
Pine Creek		272.4								272.4	Westcoast
Pouce Coupe					159.4					159.4	Westcoast
Pouce Coupe, South					252.7					252.7	Westcoast
Princess							168.0			168.0	Board
Provost							510.0			510.0	Board
Redwater		72.5								72.5	
Robertson	20.2									20.2	Sproule
Rochester									28.0	28.0	Board
Rolling Hills							27.0			27.0	Board
Rosebud							25.0			25.0	Board
Rosedale				19.0						19.0	Board
Rycroft					12.4					12.4	Board
St. Albert		42.0								42.0	Board
St. Paul				0.8						0.8	Board
Saddle Hills					25.0					25.0	Board
Samson		12.0								12.0	Board
Sarcee	150.0									150.0	Board
Savanna Creek								790.0		790.0	Westcoast
Sibbald							33.0			33.0	Board
Smith Coulee										7.0	Board
Stettler	15.0									15.0	Westcoast
Sturgeon Lake					209.0					209.0	Board
Suffield				19.0						19.0	Board
Sundre	103.7									103.7	Sproule
Sylvan Lake							44.0			44.0	Board
Tangent					170.0					170.0	Board
Three Hills Creek	35.0									35.0	Board
Turin	28.0									28.0	Board
Turner Valley	329.0									329.0	Board
Viking - Kinsella		579.0								579.0	Board
Warburg		12.0								12.0	Board

Proved Disposable Gas By Areas - Bcf

Field	Canadian Western Area	Northwestern Utilities Area	Medicine Hat Area	Local Areas	Peace River Area	Available or Authorized for Montana	Available or Authorized for Trans-Canada	Requested by Westcoast	Uneconomic	Total	Source of Reserve Estimate
Waterton - Castle River							268.8			268.8	Westcoast
Wayne							21.0			21.0	Board
West Drumheller				22.0						22.0	Board
Westerose		150.0								150.0	Board
Westerose, South		627.3					900.0			1527.3	Westcoast
Westlock		172.0		30.0						202.0	Board
West Prairie									20.0	20.0	Board
Westward Ho	155.1									155.1	Sproule
Whitelaw					110.0					110.0	Board
Wildmere		4.5								4.5	Board
Wildunn Creek							15.0			15.0	Board
Wimborne								359.0		359.0	Westcoast
Windfall		524.1								524.1	Westcoast
Wizard Lake		108.5								108.5	Board
Wood River		15.0								15.0	Board
Misc. Small Fields	80.0	80.0		37.0					420.0	617.0	Board
TOTAL - All Fields	3690.5	5831.1	1156.0	249.1	1352.1	294.2	7131.8	1800.5	828.0	22333.3	
Requirements:											
— Provincial	2324	3923	569	892	245	—	—	—		7953	
— Export	—	—	223	—	1103	294	4350	1300		7270	
— Total	2324	3923	792	892	1348	294	4350	1300		15223	
Requirements as a Per Cent of Supply	63%	67%	69%	260%	100%	100%	61%	72%		68%	

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THE WESTCOAST PROJECT IN BRITISH COLUMBIA AND NORTHWESTERN ALBERTA

Westcoast was incorporated by Act of Parliament of Canada on April 30, 1949. The principal executive offices of Westcoast and its head office are located in the Pacific Building, Calgary, Alberta. The pipeline operating offices are located at 1155 West Georgia St., Vancouver, British Columbia.

The first venture of Westcoast was the construction and operation of a 4½ inch pipeline, 17 miles in length, from Pouce Coupe, Alberta, to Dawson Creek, British Columbia, for a 29 month period from December 1950 to April 1953. The property then was transferred to Peace River Transmission Company Limited, having served the purpose of determining the feasibility of gas pipeline transmission in the temperatures prevailing in the far northern areas of Alberta and British Columbia. This project was authorized by appropriate orders issued under the Pipe Lines Act of Canada and The Gas Resources Preservation Act of Alberta hereinafter described.

AUTHORIZATIONS REQUIRED FOR GAS PIPELINE CONSTRUCTION

Under the British North America Act of 1867, the Parliament of Canada has exclusive jurisdiction over inter-provincial and international trade, including the transportation of natural gas between the provinces and in international commerce. This control is exercised under two statutes of the Parliament of Canada, namely, (1) The Pipe Lines Act, which requires the approval of the Board of Transport Commissioners for Canada for the construction and initial operation of an inter-provincial or international pipeline and (2) The Exportation of Power and Fluids and Importation of Gas Act, which requires a license from the Minister of Trade and Commerce of Canada for the exportation or importation of natural gas.

By an order dated June 6, 1955, the Board of Transport Commissioners for Canada approved the proposed route of Westcoast's pipeline and granted an extension of time for the construction and completion of the pipeline until October 31, 1957. By an order dated July 29, 1957, the Board of Transport Commissioners authorized the proposed extensions of Westcoast's gathering system in British Columbia, subject to completion in 1958.

On June 27, 1955, Westcoast received an amended license from the Minister of Trade and Commerce to export from Canada up to 125 billion cubic feet per year (approximately 343,000 Mcf of gas per day) for a period of 20 years from the commencement of such exportation. This export license is contingent upon Westcoast's agreement to supply gas to any Canadian consumer without impairment to any existing service including service to Inland Natural Gas Co. Ltd. (Inland), British Columbia Electric Company Limited (B.C. Electric) and Pacific Northwest Pipeline Corporation (Pacific Northwest), provided such Canadian consumer can be reasonably economicaly supplied. The Exportation of Power and Fluids and Importation of Gas Act, passed by the Parliament of Canada in 1955, specifically provides that any license issued thereunder can be terminated for a violation by the licensee of the terms of the license granted and the regulations applicable thereto after notification to the licensee of such default and the failure of the licensee to remedy such default.

In addition to the export license, Westcoast also received a license dated November, 18, 1955, to import natural gas from Pacific Northwest for interim service to B.C. Electric, which terminated with respect to deliveries to B.C. Electric on October 1, 1957, but remains in effect with respect to such volumes as Westcoast may require for service to its system in the event of emergency interuption of gas from Canadian sources.

The petroleum and natural gas leases issued by the government of Alberta contain a covenant by the lessee that the gas produced from the leased lands shall not be used outside the province without the prior consent of the Lieutenant Governor in Council. The appropriate Orders in Council expressing the consent of the Lieutenant Governor in Council have been obtained in connection with the lands located in Alberta from which Westcoast obtains a portion of its gas supply. Westcoast and Westcoast Transmission Company (Alberta) Ltd. (Westcoast Alberta) have also obtained the issuance of a permit to them under The Gas Resources Preservation Act of the Province of Alberta, dated June 16, 1952, authorizing the exportation of gas from the Peace River area of the Province of Alberta to the markets to be served by Westcoast. This permit, as amended, is for a term expiring December 31,1979 and restricts the amount of gas to be exported from the province, providing that not more than 1,080 billion cubic feet shall be exported during the term of the permit, nor more than 56 billion cubic feet in any 12 month period, nor more than 190 million cubic feet in any one day.

Apart from the authorizations required by any Canadian company desiring to export gas from Canada, the customer of the Canadian company desiring to purchase such gas as may be delivered to it at the United States border must obtain authorizations from the Federal authorities in the United States permitting construction of the facilities to transmit gas to the communities to be served in the United States, construction of facilities at the United States border to take delivery of the gas and a permit to import gas into the United States.

Such a United States company is a natural gas company as defined in the Natural Gas Act of 1938 as amended, and is subject to the jurisdiction of the Federal Power Commission under that Act. The Federal Power Commission is empowered to grant to such a company a Certificate of Public Convenience and Necessity to engage in the transportation or sale of natural gas in inter-state commerce for resale for ultimate public consumption. In addition, under Sec-

tion 3 of the Act, the Federal Power Commission is empowered to grant to a company desiring to import gas into the United States a permit to import the gas. The Federal Power Commission acting as agent for the President of the United States also is empowered to authorize the construction of the facilities at the International Border through which such gas may be imported.

The Pacific Northwest which is the customer of Westcoast in the United States, has obtained the above required Certificates and permits.

DESCRIPTION OF PIPELINE FACILITIES (PEACE RIVER)

Both Westcoast and Pacific Northwest having obtained the authorizations mentioned above, on October 1, 1955, Westcoast commenced the construction of its gas transmission pipeline system, which it completed on October 1, 1957. The Westcoast pipeline connects the producing areas of the Peace River country in northeastern British Columbia and northwestern Alberta to markets in British Columbia and the pipeline system serving markets in the United States at a point on the International Border between British Columbia and the State of Washington southeast of Vancouver.

The gas transmitted through the pipeline system from fields in northwestern Alberta, is purchased and gathered by Westcoast Transmission Company (Alberta) Ltd. a wholly-owned subsidiary of Westcoast, and is delivered under contract to Westcoast at a point on Westcoast Alberta's gathering system in Alberta approximately three miles east of the British Columbia border. Westcoast itself purchases and gathers gas from fields in northeastern British Columbia. The gathering system in operation consists of approximately 27 miles of line of varying diameters operated in Alberta by Westcoast Alberta, and approximately 89 miles of line of varying diameters operated by Westcoast in British Columbia.

The gathering systems are connected to Westcoast's main transmission facilities, consisting of approximately 650 miles of 30-inch diameter pipeline and 37 miles of 26-inch diameter pipeline, beginning at a point near Bonanza, Alberta, proceeding by Taylor, British Columbia generally southwest along the John Hart Highway to Prince George, and then south through the Fraser River Valley to Williams Lake, from which it runs cross country by Savona and Merritt to Hope, then to a terminus at the International Border near Sumas, Washington and Huntingdon, British Columbia, where the line connects with facilities of B.C. Electric which serves the metropolitan area of Vancouver and the facilities of Pacific Northwest which serves the States of Washington, Oregon, Idaho, Utah and Colorado.

The pipeline is powered by four Compressor Stations, spaced approximately 160 miles apart with an aggregate of 50,500 installed horse power.

There is presently under construction an additional 84 miles of gathering system in British Columbia which will extend the gathering system to a point at about Mile 73 on the Alaska Highway, and provision has been made for the installation of additional compression of 2,000 horse power. Upon completion of the installations the capacity of the pipeline system will be 400,000 Mcf per day. The ultimate capacity of the main pipeline system with the installation of addtional horse power in four additional stations will be 660,000 Mcf per day of gas. This capacity can be further extended by a parallel pipeline on the same right-of-way as required to meet increasing market demands in the future.

Gas scrubbing plant, refinery and sulphur plant at Taylor. In foreground is Westcoast's pipeline bridge over the Peace River.

DESCRIPTION OF GAS SCRUBBING PLANT

Westcoast has constructed at a site on the north bank of the Peace River in the vicinity of Taylor, British Columbia, a Gas Scrubbing Plant (the Gas Scrubbing Plant), which is processing the raw natural gas produced from gas fields north of the Peace River in British Columbia in order to make available dry specification pipeline gas for transmission and marketing and to recover raw hydrocarbons and sulphur by-products. The initial design capacity of the Gas Scrubbing Plant is defined for contract purposes as being such as to process sufficient raw gas to produce 250,000 Mcf per day of dry specification pipeline gas with raw products of not less than 10% of the propane, 55% of the butane, and essentially all of the liquid hydrocarbons contained in the raw gas delivered to the Plant. The Gas Scrubbing Plant has been constructed so that its capacity can ultimately be increased to process sufficient raw gas to produce 400,000 Mcf per day of dry specification pipeline gas.

With this end in view, it was determined that it would be more economical to install a portion of the equipment required for future expansion at the same time as installation of equipment for the initial gas available. For this reason the Gas Scrubbing Plant as constructed can be expanded without curtailing plant operations which would otherwise require interruptions in the delivery of pipeline gas.

CAPITAL COST

The capital cost of all the pipeline, compression and processing facilities to be completed as of November 1, 1958 is summarized as follows:—

WESTCOAST TRANSMISSION COMPANY LIMITED

Capital Cost — Facilities to be completed by Nov. 1, 1958
(Based on actual costs and commitments to Jan. 1, 1958)

MAIN PIPELINE		
Land, Rights of Way and Damages	$ 773,000	
Pipe and Installation	92,580,000	
River Crossings	4,544,000	
Meter and Regulator Stations	840,000	
Communications	256,000	
Miscellaneous Property	1,489,000	
Pipe and Installation	1,209,000	
Testing Equipment	267,000	
Initial Line Pack (gas)	70,000	$102,028,000
GATHERING SYSTEM		
Pipe and Installation		21,414,000
COMPRESSOR STATIONS		
Compressors and Installation		21,314,000
GAS SCRUBBING PLANT		
Building, Tanks, Processing Equipment and Installation		19,603,000
HOUSING INVESTMENT		
Processing Plant and Compressor Stations		1,958,000

UNDISTRIBUTED COSTS

Corporate and Management	$ 6,477,000	
Engineering and Supervision	9,232,000	
Interest During Construction	8,152,000	
Financing Costs	3,138,000	
Exchange Loss	3,560,000	30,559,000
Total		$196,876,000
Less Interest Earned		783,000
Total Capital Cost		$196,093,000

In order to provide housing accommodation for the employees for the pipeline and Gas Scrubbing Plant operating personnel, Westcoast arranged for the erection of 136 housing units situated as follows:—

Fort St. John, British Columbia	85 Units
Taylor Flats, British Columbia	9 Units
Fort McLeod, British Columbia	16 Units
Australian, British Columbia	12 Units
Savona, British Columbia	14 Units

This construction was carried out through the agency of Westcoast Transmission Housing Ltd., a wholly-owned subsidiary of Westcoast at a cost to the present time of $2,346,981 including mortgage loans.

WESTCOAST PRODUCTION CO. LTD.

Westcoast Production Co. Ltd. (a wholly owned subsidiary of Westcoast) holds an interest in oil and gas properties comprised in 2,304,120 acres in northern Alberta and northeastern British Columbia, equivalent to a net 561,931 acres on which there are completed 87 wells capable of production, including 6 oil wells and 81 gas wells. Westcoast Production is currently proceeding with active development of the properties held by it in northeastern British Columbia and northern Alberta. In addition with its associates, Pacific Petroleums Ltd., Canadian Atlantic Oil Company Ltd., Phillips Petroleum Company and El Paso Natural Gas Company, Westcoast Production is participating in drilling exploratory wells in two structures in the foothills area of southern Alberta, namely, the Sullivan Creek field and Keystone field.

GAS PURCHASE AGREEMENTS —

Approximately 65% of the gas initially contracted for purchase by Westcoast is covered by contracts with Pacific Petroleums Ltd. and its associated companies.

A description of the terms and conditions of the Gas Purchase Agreements held by Westcoast is as follows:—

Westcoast has four contracts for the purchase of natural gas with producers in British Columbia providing for the delivery of the following maximum daily amounts of gas:—

(Volumes at 15.025 psia and 60° F.)

Period	Pacific Petroleums Ltd.	Phillips Petroleum Company	J. B. White, A. M. Lloyd et alia	Gulf States Oil Company of Canada and El Paso Natural Gas Company
Beginning November 1, 1958 and continuing during the term of contract (the life of the field)	230,000 Mcf (1)	—	—	—
January 1, 1959 to December 31, 1959	—	62,500 Mcf	30,000 Mcf	5,000 Mcf
January 1, 1960 and each year thereafter	—	62,500	50,000 (2)	5,000

Note:

(1) Westcoast, on 4 months' notice, has the option to increase the daily gas deliveries by 25,000 Mcf.

(2) Westcoast, upon notice from the sellers that the gas is available, has the option to increase the daily gas deliveries at the rate of 1,000 Mcf, up to an additional total of 50,000 Mcf, for each 10,000,000 Mcf of proved recoverable reserves established for the lands contract in excess of 500,000,000 Mcf. In the event that Westcoast increases it sales to Pacific Northwest over 300,000 Mcf per day, the Selers may require Westcoast to exercise it option as aforesaid.

Westcoast Alberta has five contracts for the purchase of natural gas with producers in Alberta providing for the delivery to Westcoast Alberta of the following maximum daily amounts of gas:

(Volumes at 15.025 psia and 60° F.)

Period	Pacific Petroleums Ltd. (1)	Pacific Petroleums and Westcoast Production Co. Ltd. (2) (3)	Imperial Oil Limited (3)	Pathfinder Petroleums Limited	Royalite Oil Company and Canadian Fina Oil Limited
January 1, 1958 to December 31, 1958	30,000 Mcf	20,000 Mcf	11,500 Mcf	2,500 Mcf	27,000 Mcf
Each year thereafter	30,000 Mcf	20,000 Mcf	15,700 Mcf	2,500 Mcf	40,000 Mcf

Notes:

(1) By supplementary agreement dated April 21, 1955, Westcoast Alberta has an option to increase the daily gas deliveries up to December 31, 1960 by 30,000 Mcf.

(2) By supplementary agreement dated April 21, 1955, Westcoast Alberta has an option to increase the daily gas deliveries up to December 31, 1960 by 10,000 Mcf.

(3) Deliveries under this contract may be deferred, at the option of Westcoast, to November 1, 1960.

In addition to the above contracts, Westcoast Alberta has entered into contracts with Shell Oil Company and The British American Oil Company Limited, to the effect that Westcoast Alberta and the two respective producers will begin consultations prior to January 1, 1959 for the purpose of entering into gas purchase contracts with respect to the gas to be produced from certain lands in Alberta at prices to be mutually agreed upon, which shall not be less than a stated minimum. The gas under the respective producers' lands, except for any amount required for local distribution, is dedicated to these contracts until January 1, 1960, subject to the consummation of gas purchase contracts with such producers within the time specified in such contracts.

Westcoast Alberta has entered into a contract with Westcoast to deliver to Westcoast all of the gas it has contracted to purchase from producers in Alberta. Westcoast Alberta is financed, managed and operated by Westcoast and the price paid by Westcoast for the gas is an amount equivalent to the contract price paid in each case by Westcoast Alberta to the producer plus an additional amount which will provide for the payment of all costs of Westcoast Alberta and provide it with a reasonable return on the investment in its pipeline facilities.

The various gas purchase contracts are generally similar in form, the producers being obligated to make delivery of the gas at a central point in each field subject to the right to use such volumes of gas as may be required for production and development purposes. The contracts provide that the producers shall deliver a specified maximum daily volume of gas from the leases specified therein and that Westcoast or Westcoast Alberta, as the case may be, except in the case of the British Columbia acreage of Pacific Petroleums Ltd., will take delivery of a total volume in each year of a minimum of 263 times the maximum daily volume obligation in effect from time to time. In respect to all gas delivered by producers in Alberta and from points south of the Peace River in British Columbia, the gas delivered shall be dry pipeline gas free of hydrocarbons and sulphur as specified. In respect to gas delivered north of the Peace River in British Columbia, the gas shall be delivered to Westcoast in its raw state as produced except that the producer may extract hydrocarbons and liquids by mechanical separation where such processing will not reduce the liquid content of the gas below 0.5 gallons of pentane plus per Mcf.

The prices, which are to be paid under the contracts previously referred to for gas produced in Alberta and from fields south of the Peace River in British Columbia and for the residue gas at the outlet of the Gas Scrubbing Plant in the case of gas delivered from fields north of the Peace River, are as follows:

FIELD PRICE DRY PIPELINE GAS	Per Mcf Cents
For the period following the first delivery of Gas to January 1, 1963	10 c
For the year 1963	10¼c
For the year 1964	10¼c
For the year 1965	10½c
For the year 1966	10½c
For the year 1967	10¾c

For the year 1968	11 c
For the year 1969	11¼c
For the year 1970	11½c
For the year 1971	11¾c
For the year 1972	12 c
For the year 1973	12 c
For the year 1974	12¼c
For the year 1975	12½c
For the year 1976	12½c
For the year 1977	12½c

provided that, for each month after commencement of deliveries hereunder and before November 1, 1963, during which the maximum billing demand billed to its customers by Buyer is less than an average of 460,000 Mcf per day, the said price shall be reduced as follows:

	Adjustment Per Mcf Cents
Less than 460,000 but equal to or more than 425,000	½c
Less than 425,000 but eqaul to or more than 400,000	¾c
Less than 400,000 but equal to or more than 375,000	1¾c
Less than 375,000 but equal to or more than 350,000	2¾c
Less than 350,000 but equal to or more than 325,000	3¼c
Less than 325,000 but equal to or more than 300,000	3¾c
Less than 300,000	4 c

On the basis of anticipated maximum firm gas sales of 400,000 Mcf per day by November 1, 1959 the price payable to producers will be 9¼c per Mcf.

All of the purchase contracts contain provisions to the effect that, if Westcoast or Westcoast Alberta should enter into any contract for the purchase of gas with a producer in the Peace River area of Alberta or British Columbia, as the case may be, containing terms more favorable to the producer than those contained in the existing contracts, the more favorable terms will become applicable to the existing contracts in each Province at the option of the producers in such Province.

The contracts contain provisions for adjusting the price to reflect changes in the rate of exchange between Canadian and United States funds below 95% or above 105%, as the case may be, and for increases in certain Canadian taxes on the producers. The contracts, with certain exceptions, provide that, at the expiration of the 20-year period, the price to be paid by the Westcoast or Westcoast Alberta, as the case may be, for natural gas is to be mutually agreed upon with the producers and in the event that no agreement shall be reached, the price in effect in the 20th year shall prevail, subject to the respective producers' rights to terminmate their contracts upon six month's notice.

In the case of raw gas containing hydrocarbons and sulphur delivered from fields north of the Peace River, Westcoast will pay, as an additional component part of the price per Mcf of gas delivered, up to 40% of the sales value of liquid petroleum gases, natural gasoline and sulphur recovered in the Gas Scrubbing Plant, calculated in respect to each delivery point as follows:—

By-Products Price Schedule

The portion of the price per Mcf based on the by-products shall be the total of the component prices per Mcf for pentanes plus, LPG, sulphur and other material extracted and sold, determined for each delivery point as follows:

(a) The component price for pentanes plus per Mcf of Gas delivered obtained by multiplying the GPM (gallons per million cubic feet) of pentanes plus by the adjustment for actual monthly plant production as hereinafter defined, by the applicable percentage set forth in Subsection (e) of this Section 2 and by the average price for pentanes plus being received by Buyer F.O.B. its Gas Processing Plant. The adjustment for actual monthly plant production hereinbefore mentioned shall be a fraction, the numerator of which shall be the actual net plant production of pentanes plus during the month and the denominator of which shall be the sum of the pentanes plus contained in the Gas delivered by all Sellers during the month.

(b) The component price of LPG (Liquidfied Petroleum Gas) per Mcf of Gas delivered obtained by multiplying the GPM of LPG by the adjustment for actual monthly plant production as hereinafter defined, by the applicable percentage set forth in Subsection (e) of this Section 2 and by the average price for LPG being received by Buyer, F.O.B. its Gas Processing Plant. The adjustment for actual monthly plant production as hereinbefore mentioned shall be a fraction, the numerator of which shall be the actual net plant production of LPG during the month and the denominator of which shall be the sum of the LPG contained in the gas delivered by all sellers during the month.

(c) The component price for sulphur per Mcf of Gas delivered obtained by multiplying the LPM (Pounds per Mcf) of sulphur by the adjustment for Actual monthly plant production as hereinafter defined, by the applicable percentage set forth in Subsection (e) of this Section 2, and by the average price for sulphur being received by Buyer, F.O.B. its Gas Processing Plant. The adjustment for actual monthly plant production hereinbefore mentioned shall be a fraction, the numerator of which shall be the actual net plant production of sulphur during the month and the denominator of which shall be the sum of the sulphur contained in the gas delivered by all sellers during the month.

(d) The component price for other materials extracted and sold per Mcf of Gas delivered shall be determined in a manner comparable with the provisions of Subsections (a), (b) and (c) of this Section 2.

(e) The applicable percentage to be employed in Subsections (a), (b), (c) and (d) of this Section 2 for the gas delivered hereunder at each delivery point shall be as follows:

GMP of Pentanes in Gas	Applicable Percentage
Less than 0.25	-0
Equal to 0.25 but less than 0.50	37%
Equal to 0.50 but less than 0.75	38%
Equal to 0.75 but less than 1.00	39%
Equal to or more than 1.00	40%

provided, however, notwithstanding anything hereinbefore set forth in this Article VI, the Buyer specifically reserves the right to renegotiate an equitable charge for processing raw gas delivered at any delivery point which has a GPM of pentanes plus less than 0.25, and failing agreement, to discontinue accepting raw Gas at such delivery point.

Westcoast has provided for the sale of the hydrocarbons and sulphur recovered in the Gas Scrubbing Plant in accordance with arrangements as hereinafter described.

HYDROCARBON SALES AGREEMENT

Westcoast has entered into an agreement (the "Hydrocarbon By-Product Purchase Agreement") with Pacific Petroleums Ltd. ("Pacific") and Phillips Petroleum Company ("Phillips") whereby Pacific and Phillips will purchase the entire production of liquefied petroleum gas (LPG) and liquid hydrocarbons from the Gas Scrubbing Plant.

The term of the Hydrocarbon By-Product Purchase Agreement is for an initial period ending at the expiration of the twentieth year following the year in which the first delivery of raw by-products shall be made by Westcoast, and will continue in effect thereafter from year to year until terminated on eighteen months' notice by either party to the other. The contract provides that Pacific and Phillips will pay 35c per barrel for mixed propane and butane and $3.25 per barrel for liquid hydrocarbons for a period ending with the expiration of the fifth year of the aforementioned twenty-year period, and thereafter Pacific and Phillips will pay for each succeeding five-year period such prices as shall be mutually agred upon by the parties, and, in the absence of such mutual agreement, the prices to be paid shall be the prices in effect for the preceding five-year period.

Pacific and Phillips are jointly constructing and will own and operate the Refining Plant at a site adjacent to the Gas Scrubbing Plant for the purpose of processing the hydrocarbon by-products purchased from Westcoast into marketable products, including finished propane, butane, gasolines, diesel fuel and other liquid distillates. Pacific and Phillips are actively engaged in marketing petroleum products in the area which can be served from the Refining Plant site.

ACID GAS SALES AGREEMENT

Under an agreement between Westcoast and Jefferson Lake Sulphur Company ("Jefferson Lake"), Westcoast has agreed to sell to Jefferson Lake the production of acid gas (for the manufacture of sulphur) from the Gas Scrubbing Plant.

Jefferson Lake has constructed, in proximity to the Gas Scrubbing Plant, a plant for processing acid gas for the production therefrom of elemental sulphur. The Sulphur Plant has an initial

daily design capacity of 300 long tons of sulphur, and Jefferson Lake has agreed that, as the supply of acid gas from the Gas Scrubbing Plant is increased in increments to yield at least an additional 100 long tons of sulphur per day, the capacity of the plant will be correspondingly expanded, on notice from Westcoast to a maximum productive capacity of not exceeding 600 long tons per day.

Westcoast has agreed, until December 31, 1959, to use its best efforts to process not less than 226,000 Mcf per day of gas producing an acid gas stream from which 290 long tons of sulphur per day can be produced by Jefferson Lake and, after December 31, 1959, to process additional volumes of gas sufficient to enable Jefferson Lake to produce in excess of 300 long tons of sulphur per day.

The parties have agreed that all acid gas produced by the Gas Scrubbing Plant up to the actual capacity of the Sulphur Plant shall be made available to Jefferson Lake and that Jefferson Lake shall accept and pay for all such acid gas made available to it, except that Jefferson Lake shall not be obligated to pay for acid gas, in excess of the initial design production capacity of its plant, which it is unable to process at any given time.

Westcoast has agreed to give Jefferson Lake the right of first refusal to purchase, on terms no less favorable to Westcoast than it can otherwise obtain, all acid gas produced by the Gas Scrubbing Plant in excess of the volumes contracted for.

The price of acid gas, delivered to Jefferson Lake, is expressed in sulphur equivalent and is based on a formula related to daily average production of sulphur and the average sales price per long ton received during the preceding quarter by Jefferson Lake, F.O.B. its plant, less freight, all allowances and local sales taxes. The price payable per long ton of calendar monthly quantity of sulphur (daily average production or equivalent, multiplied by the number of days in the month) for each quarter shall be the base price given below opposite the corresponding daily average production or equivalent, adjusted in direct ratio to variations, from $20.50 per long ton, in the net-sales-sulphur-price F.O.B. plant for such quarter. One-half of the excess over, or deficiency below, $20.50 per long ton, shall be added to, or substracted from, the base price, as the case may be, provided that the net-sales-sulphur-price F.O.B. plant is never to be less than $16.50 per long ton.

Price Table

Daily Average Production or Equivalent (Long Tons)	Base Price Per Long Ton
159.9 and under	$ 4.95
160 to 169.9	5.37
170 to 179.9	5.79
180 to 189.9	6.21
190 to 199.9	6.63
200 to 209.9	7.05
210 to 219.9	7.47
220 to 229.9	7.89

230 to 239.9	8.31
240 to 249.9	8.73
250 to 259.9	9.15
260 to 269.9	9.57
270 to 279.9	9.75
280 and over	10.00

After ten years, Westcoast has the option to continue the aforementioned price arrangement formula or, at its option, to receive thereafter one-half of the operating earnings of Jefferson Lake realized from sulphur produced or products recovered from acid gas furnished by Westcoast under the agreement.

The agreement is for a primary term of twenty years, subject to extension for fixed periods in the event that Jefferson Lake shall be required to increase its plant capacity as described above, and thereafter the agreement shall continue in force from year to year subject to termination at the election of either party.

GAS SALES AGREEMENTS - GENERAL

Westcoast has entered into contracts for the sale of the natural gas transported over its pipeline to three customers, Inland Natural Gas Co. Ltd. (Inland), British Columbia Electric Company Limited (B.C. Electric), and Pacific Northwest Pipeline Corporation (Pacific Northwest).

Inland has constructed and is presently operating transmission and distribution facilities required to make gas available to the British Columbia communities of Quesnel, Williams Lake, 100 Mile House, Merritt, Kamloops, North Kamloops, Vernon, Salmon Arm, Enderby, Armstrong, Kelowna, Glenmore, Penticton, Summerland, Oliver, Osoyoos, Grand Forks, Rossland, Trail, Tadanac, Castlegar, Kinnaird and Nelson in the Okanagan Valley and West Kootenay districts of the Province of British Columbia.

B.C. Electric has distributed manufactured gas in the lower mainland area of British Columbia for many years, the principal market being in metropolitan Vancouver. In November 1956 through a connection at the International Border near Huntingdon, British Columbia, B.C. Electric was able to take delivery of natural gas made available from Pacific Northwest, and constructed new facilities and converted its manufactured gas facilities for the use of natural gas. Upon gas being made available at Huntingdon from the Westcoast pipeline system on October 1, 1957, the interim supply of gas from Pacific Northwest was terminated.

Pacific Northwest, in October 1956, completed the construction of a natural gas pipeline from the San Juan Basin area of New Mexico and Colorado to the International Border at Sumas, Washington, adjacent to Huntingdon, British Columbia, and is now transmitting gas to communities in the States of Colorado, Utah, Wyoming, Idaho, Oregon and Washington, making use of gas provided from sources in the San Juan Basin and from gas delivered to its facilities by Westcoast at Sumas, Washington.

The following is a summary of the maximum daily quantities of gas which (subject to certain options to increase, described below) Westcoast may be obligated to deliver to the respective purchasers during the twenty-year period covered by the contracts:

(Volumes 14.73 psia and 60° F.)

	Inland	B.C. Electric	Pacific Northwest
First Period	28,000 Mcf (1)	40,000 Mcf (1)	203,308 Mcf (2)
Second Period	36,000 Mcf (3)	50,000 Mcf (3)	252,885 Mcf (4)
Third Period	43,000 Mcf (5)	50,000 Mcf (5)	303,462 Mcf (6)

(1) Prior to November 1, 1958.
(2) Prior to January 1, 1958.
(3) Year ending November 1, 1959.
(4) Year ending December 31, 1958.
(5) Year ending November 1, 1960, and each year thereafter to and including the year ending November 1, 1977.
(6) Year ending December 31, 1959, and each year thereafter to and including the year ending December 31, 1977

Inland has agreed to pay the demand rate on a daily minimum of 24,000 Mcf during the second period and 29,500 Mcf during the third period but no daily minimum is provided for the first period. Pacific Northwest has agreed to pay the demand rate on the full amount of the maximum gas deliverable to it in each of the three periods referred to in the table above, but has reserved the right to reduce these quantities by 50,000 Mcf per day until January 1, 1960, but not thereafter, B.C. Electric has not agreed to pay the demand rate on any daily minimum quantities of gas, but has advised the Company that it anticipates that it will require, during the first and second periods, approximately 42,000 Mcf daily and, during the third period, approximately 58,000 Mcf daily.

In its contracts with Inland and B.C. Electric, Westcoast has agreed not to supply gas to any other person for consumption or resale in the areas served by these companies unless it is required to do so by valid order of any public regulatory authority having jurisdiction, or, unless, after notice, Inland or B.C. Electric, as the case might be, should fail to supply any bona fide purchaser on reasonable terms.

GAS SALES AGREEMENT - INLAND NATURAL GAS CO. LTD.

Gas is sold by Westcoast to Inland under the terms of two service agreements. The first Inland agreement, covering sales to communities in the interior of British Columbia other than the West Kootenay district (the "Inland Agreement"), as amended, permits Inland, at any time prior to November 1, 1959, on 12 months' notice, to increase the daily maximum amount of gas which Westcoast must stand ready to deliver to it, up to, but not in excess of, a total of 32,000 Mcf. Provision is also made for further increases thereafter, up to an aggregate of 16,000 Mcf additional, in the event that the proven and recoverable reserves available to Westcoast and its pipeline facilities are adequate and the demand obligations of Westcoast's other purchasers are adequately provided for. The price of the gas to be delivered to Inland under both agreements is the aggregate of a commodity charge of 20c per Mcf and a demand charge of $3.21 per Mcf of the monthly

billing demand. The billing demand for any period is to be ascertained by determining the greater of (1) the largest amount of firm gas (as defined in the agreement) delivered to Inland on any day during the 12 months ended with the period or (2) the daily minimum amount of gas agreed to be purchased. The agreements provide that the total of the commodity charge and the demand charge shall not exceed 47c per Mcf prior to November 1, 1958. At a 75% load factor, the price would be 34.1c per Mcf. Gas may also be delivered and purchased on an interruptible basis, subject to curtailment by Westcoast. The price to be paid for such interruptible gas is 22c per Mcf gas delivered in excess of the billing demand for the day of delivery.

In addition to delivery through Westcoast's own facilities at various points on Westcoast's main line, gas is being delivered, up until May 1, 1961, by Westcoast to Inland, through facilities constructed by Inland, at several delivery points from the vicinity of Savona south to Penticton. Westcoast will compensate Inland during this period for the use of its facilities by payment of a monthly sum equivalent to 1.25% of the book cost of such facilities less depreciation, the said sum in no event to exceed $41,667 per month. After May 1, 1961, gas under the Inland Agreement will be delivered to Inland at one delivery point near Savona and Inland will bear the full cost of delivery to the points south from Savona to Penticton of all gas purchased by it under the Agreement.

The Inland agreement, covering the sale of gas for distribution in the West Kootenay district (the "Inland West Kootenay Agreement") provides that Inland may, on 12 months' notice, increase the daily maximum amount of gas to be delivered by Westcoast 11,000 Mcf per day up to 21,500 Mcf of gas per day. Westcoast agrees to deliver the gas for distribution in the West Kootenay district at a point on the Inland pipeline system south of the city of Penticton. Inland will make available its pipeline connecting Penticton and Westcoast's main line at a point near Savona in consideration of a rental payment calculated at the rate of $1.15 per Mcf of the monthly billing demand of all volumes of gas transmitted from Penticton to the West Kootenay district.

It will be noted that the above contracts with Inland both contain provision for substantial payment by Westcoast to Inland on account of the carrying charges and capital expenditures incurred by Inland in constructing its distribution facilities from the connection thereof with the Westcoast main line at Savona to the terminus at Nelson.

The contribution by Westcoast towards the cost of these facilities is contained in the rental payment to be made under the Inland Agreement at the rate of $500,000 for 3½ years — a total contribution of $1,750,000. This contribution is made to Inland by way of rental payment for the express purpose of assisting Inland in carrying the investment in its main line facilities from Savona to Penticton during the initial years of operation prior to Inland building up its market in the communities served by the pipeline from Savona to Penticton to their full capacity estimated to be obtained on January 1, 1961.

Under the Inland West Kootenay Agreement, Inland undertook the building of its main distribution line from Penticton to Nelson so as to provide a service to the West Kootenay area in which are situated the populous cities of Rossland, Trail and Nelson, whose economy is based on the operation of the Consolidated Mining & Smelting Company plant at Trail, one of the largest non-ferrous smelting and refining plants in the world, with which is operated a substantial fertilizer and chemical division making use of by-products from non-ferrous metals treated.

The contribution of Westcoast to the operation of this pipe line is the reduction in the demand rate for gas transmitted through the pipe line of $1.15 per Mcf based on maximum firm sales in each month for the term of 20 years from the date of first delivery.

As a result of the policy adopted by Westcoast in providing the rental payments, which are applied by Inland against the capital cost investment of the facilities constructed by it, gas has been made available at an economic price not exceeding the price charged for gas distributed in other areas in British Columbia south of the Peace River area. The number of communities eventually to be served will be 37 communities. Gas service to these communities will be useful in maintaining the economy of the fruit and vegetable industries carried on in the Okanagan area and will also be available to the mining, smelting and forestry industries in the West Kootenay area.

Inland has not only provided a gas transmission system plus a gas distribution system serving the residents and industry of the communities above mentioned in British Columbia, but its facilities also serve to supply gas to 5 of the electrical generation plants of the British Columbia Power Commission situated at the communities of Prince George, Quesnel, Williams Lake, 100 Mile House and Kamloops. The gas is provided at a very substantial saving from the cost of oil. This savings is reflected in the rate for electrical energy charged to each of the communities served.

GAS SALES AGREEMENT - BRITISH COLUMBIA ELECTRIC COMPANY

Gas will be sold to B.C. Electric under three contracts, namely, the principal service agreement as amended, a guaranteed interruptible contract, and a thermal plant agreement.

The principal service agreement permits B.C. Electric, at any time prior to November 1, 1959 and on 12 months' notice, to increase the daily maximum amount of gas which Westcoast must stand ready to deliver to it, up to 50,000 Mcf per day. At any time after B.C. Electric's purchases have reached a maximum of 50,000 Mcf of gas per day, B.C. Electric may, upon not less than 10 months' notice expiring on November 1 in any year, increase the daily maximum amount of gas to be delivered to it up to, but not exceeding 130,000 Mcf.

The price to be paid for the gas to be delivered to B.C. Electric under the principal service agreement is the same as that provided for in the Inland contracts and is computed in the same manner, except that the billing demand for any day or month shall be the greater only of (1) the greatest quantity of firm gas delivered on any day during the 12 months ending with such month, or (2) 90% of the greatest previous billing demand. If B.C. Electric shall exercise its right to increase the demand obligations and if the aggregate demand obligations of all of Westcoast's purchasers shall then exceed 520,000 Mcf of gas per day, the gas delivered to B.C. Electric shall, to the extent that it causes the aggregate demand obligations to exceed 520,000 Mcf, be billed at a commodity charge rate of 21.2c per Mcf rather than 20c per Mcf. Interruptible gas is priced on the same basis as in the Inland Agreement and the agreement contains the same price limitation until November 1, 1958.

The guaranteed interruptible contract provides that on or before May 1, 1957 and January 1 in each of the calendar years 1958 to 1961, B.C. Electric will advise the Company of its peak day requirements for firm gas and interruptible gas, respectively, under the principal service agreement for the year starting on the first day of November following. The Company agrees to hold available for delivery to B.C. Electric up to an aggregate of 57,500 Mcf of gas per day for a minimum

number of 325 days in each of the years beginning November 1, 1957, November 1, 1958 and November 1, 1959 and a minimum number of 265 days and 250 days, respectively, in the years beginning November 1, 1960 and November 1, 1961.

The thermal plant agreement provides that before July 1, 1958 B.C. Electric will advise Westcoast specifying the maximum volume of natural gas per day to be used in a thermal power plant it intends to construct in the vicinity of Vancouver, which it wishes Westcoast to supply to it on a date which shall be the first day of any of the first seven months in the year 1961. The volumes so specified shall be 24,000 Mcf or any multiple thereof up to 144,000 Mcf. After the first notice, B.C. Electric may give Westcoast further notices specifying a day which shall be the first day of a month and shall not be earlier than three calendar years after the giving of each such notice on which B.C. Electric desires the maximum daily volume of gas to be supplied to it by Westcoast to be increased to a volume therein specified which is a multiple of 24,000 Mcf and not exceeding 144,000 Mcf in the aggregate. The volume so specified shall be the contract demand in force and the delivery of gas up to the volume of such contract demand shall not be subject to interruption and shall have priority over all deliveries made by Westcoast on an interruptible basis. The price, subject to certain adjustments, shall be the demand charge of $3.21 per Mcf of contract demand not exceeding 96,000 Mcf, and a commodity charge of 20c per Mcf. The price to be paid with respect to gas delivered in excess of 96,000 Mcf up to 144,000 Mcf is not fixed by the contract. The term of the contract is 20 years from the date of first deliveries of gas under the contract.

GAS SALES AGREEMENT - PACIFIC NORTHWEST PIPELINE CORPORATION

The agreement between Westcoast and Pacific Northwest provides that the price to be paid by the latter for gas to be purchased from Westcoast is to be 22¼c per Mcf until January 1, 1959 and 22c per Mcf thereafter for the balance of the term of the contract, such prices being based upon the application of demand and commodity rates at a 90% load factor. Pacific Northwest agrees to pay to Westcoast a minimum annual bill in an amount equal to 90% of the revenues which would have resulted from the demand and commodity rates above described on a 100% load factor applied to the volumes Westcoast is obligated to deliver. Pacific Northwest also has the right under the contract to purchase from Westcoast under the same terms and conditions the next 100,000 Mcf per day which Westcoast has available for delivery and sale over and above Pacific Northwest's contract demand and the requirements of Westcoast's markets in Canada, subject to the grant of required governmental authorizations in Canada and the United States to both Westcoast and Pacific Northwest.

Recently there has been comment in the press and in Parliament with respect to the price charged by Westcoast for gas sold at the International Border for consumption in the United States, namely 22c on the basis of 90% load factor. This price is contrasted to the rate charged by Westcoast for gas delivered into the facilities of the distributing companies in British Columbia, namely, B.C. Electric and Inland, which is at a rate equivalent to 32c per Mcf at 90% load factor basis.

Reference has been made to the regulations under the Export and Importation of Gas Act which provide that the price charged by the holder of an Export License for gas exported by it shall not be lower than the price at which gas is supplied by it in similar quantities and under similar conditions of sale for consumption in Canada.

The gas delivered to Pacific Northwest is not supplied in similar quantities nor under similar conditions to that supplied for consumption in Canada.

The Pacific Northwest contract provides for the sale of 300,000 Mcf per day at a 90% load factor for which Pacific Northwest must pay whether taken or not. The B.C. Electric contract, on the other hand, does not require that B.C. Electric take any particular volume of gas and they need not pay for any gas not taken. The B.C. Electric contract was originally negotiated on the then estimate that B.C. Electric would require about 40,000 Mcf per day at the end of a five-year period (approximately 13% of the contract obligation of Pacific Northwest).

The sale of gas to B.C. Electric is at the point of consumption, whereas the sale of gas to Pacific Northwest is at the International Border where there are no consumers, the major points of consumption being far to the south.

No community in the Pacific Northwest States is receiving natural gas at a lower city gate rate than Vancouver. The city rates at the boundaries of Seattle, Portland and other areas in the Pacific Northwest States were originally the same as for the Vancouver area. However, Pacific Northwest has made application to the Federal Power Commission for, and has put into effect, an increase in rates of 17% which has increased the city gate rates payable by the United States communities from 32c, to 37.4c. Pacific Northwest is free to apply for further increases as its costs increase from year to year.

Without the sale of 300,000,000 cubic feet per day by Westcoast at the Border, Westcoast could not have built a pipeline from the Peace River area and delivered gas at Vancouver under a rate of about $2.00 per Mcf.

If the Peace River gas were not available for Vancouver from the present Westcoast system, Vancouver's only recourse would have been to obtain gas from the Pacific Northwest Company at the same rate it is now paying Westcoast plus the 17% increase now in effect, plus any additional increase which Pacific Northwest Company would charge in the future, plus the import duty on gas currently fixed at 3c per Mcf.

The facts are that Westcoast negotiated the best price possible at the Border in 1954 based on fuel oil competition and the competition of supplies of gas from the United States sources. Westcoast adopted the city gate rate of competitive United States gas at Vancouver which initially was based on fuel oil competition at Portland, despite the fact that all costs of fuels in Vancouver were much higher than in Portland at the time the rates were fixed.

B.C. Electric, after full investigation entered into its 20-year contract in order to ensure a firm supply for all of its requirements for 20 years from Westcoast.

The negotiating of the 22c price at the Border by Westcoast was fully publicized in December 1954, again fully disclosed before the Oil and Gas Conservation Board of Alberta in March 1955, again fully discussed before The Board of Transport Commissioners in June 1955 and full information furnished to the Department of Trade and Commerce upon the application for the Export License. As a result of the contract fixing the 22c price for the sale of 300,000 Mcf per day Westcoast has supplied gas to communities in British Columbia at a price much less than could be obtained otherwise, and it has completed its project without any subsidy or cost to the people of Canada with benefit to thousands of residents in British Columbia and has provided British Columbia and Northern Alberta with a natural gas industry.

6

POTENTIAL SALES OF GAS

1958 - 1962 INCLUSIVE

Westcoast estimates that the demand for gas in the markets presently served by the Westcoast Peace River pipeline system and the proposed pipeline to be constructed from Southern Alberta to the International Boarder at Kingsgate, British Columbia, for the years 1958 to 1962 inclusive, are as follows:—

Potential Sales of Natural Gas
Westcoast Transmission Company Limited
Years 1958 to 1962 Inclusive

	1958	1959	1960	1961	1962
Maximum Day Sales (Mcf @ 14.73 Psia)			MCF		
British Columbia Markets	62,120	90,076	111,976	183,444	231,353
Pacific Northwest Pipeline Corp.					
Presently authorized	252,885	303,462	303,462	303,462	303,462
Future	—	—	404,616	505,770	606,924
Total Pacific Northwest	252,885	303,462	708,078	809,232	910,386
Total Maximum Day	315,005	393,538	820,054	992,676	1,141,739
Annual Volumes (MMcf @ 14.73 Psia)			MMCF		
British Columbia Markets	17,970	25,446	33,532	55,514	71,927
Pacific Northwest Pipeline Corp.					
Presently authorized	83,073	99,687	99,687	99,687	99,687
Future	—	—	132,916	166,145	199,375
Total Pacific Northwest	83,073	99,687	232,603	265,832	299,062
Total Annual Volumes	101,043	125,133	266,135	321,346	370,989

These estimates are based upon Westcoast's appraisal of the information furnished to Westcoast by its customers in British Columbia, Pacific Northwest Pipeline Corporation and El Paso Natural Gas Company.

7

COMPETITIVE FACTORS AFFECTING GAS PRICE AND MARKETS

Instead of presenting a theoretical discussion of competitive factors affecting the gas price and markets, it is felt that a statement of the actual competitive factors encountered by the officials of Westcoast in negotiating the contracts for sale of the gas transmitted through the Westcoast pipe line would be of more value.

Immediately following the authorization of Westcoast to export gas from Canada in June 1952, Pacific Northwest completed its plan to purchase gas supplies in the Four Corners area of New Mexico, Colorado, Utah and Wyoming and made application to the Federal Power Commission for authority to build a pipe line from the San Juan Basin to Seattle and serve the market which Westcoast planned to serve through its subsidiary, Westcoast Transmission Company, Inc.

This application was consolidated with the application of Westcoast Transmission Company, Inc., and the joint hearing of the applications proceeded before the Federal Power Commission from June 1952 to April 1954. On June 20, 1954, the Federal Power Commission approved the application of Pacific Northwest and dismissed the application of Westcoast Transmission Company, Inc. One of the reasons advanced for the dismissal of the application was that the Commission did not think it in the public interest to authorize a project which would be dependant wholly upon gas supplies originating in Canada. On the other hand, the Commission pointed out that the use of Canadian gas as a supplementary source of supply was highly desirable.

Westcoast Transmission Company, Inc. appealed the decision of the Commission to the United States Court of Appeals, and immediately commenced negotiations to sell the gas which it had available in the California market, by-passing the market in Washington, Oregon and Idaho which had been allocated to the Pacific Northwest.

After extended negotiations with the distributing companies in California, and later with the officials of the El Paso (the supplier of gas to the California Gas Companies), and the officials of Pacific Northwest, it was determined that the economic value of Canadian gas delivered at San Francisco was approximately 34¢ per Mcf on the basis of a 90% load factor. This value was

established in San Francisco by the delivered cost of gas at San Francisco from Texas and Arizona and the competitive value of Bunker fuel oil available for industrial purposes in the San Francisco Bay area.

Since the demand for gas which created the market for Canadian gas was in the State of California the price of gas exported from Canada necessarily reflected the cost of moving the gas from the International Border through the facilities of Pacific Northwest plus the cost of moving the gas from a point on the Pacific Northwest pipeline near Boise, Idaho, through a proposed pipeline to be built by El Paso from Boise, Idaho, to the vicinity of San Francisco. The charge established for the use of the facilities of Pacific Northwest was 3¢ per Mcf. The cost of delivering the gas from Boise, Idaho, to a point in the vicinity of San Francisco was estimated at 9¢ per Mcf. As a result, since the competitive value of gas transmitted from Texas and Arizona fields to San Francisco was 34¢ per Mcf, the net value of Canadian gas at the International Border, was 34¢ less 12¢, namely, 22¢ per Mcf.

In the gas sales agreements between Westcoast and Inland and B.C. Electric for the supplies of gas to Canadian consumers the rate fixed was the same rate at which gas was available at the city gates of Seattle, Portland and Spokane in the adjoining States of Washington and Oregon. This was the competitive value of gas at Vancouver because of the agreement of Pacific Northwest that it would supply Vancouver with gas at the above rates from its United States sources. This rate was less than the then competitive rate for fuel oil at Vancouver. It was far less than any rate based on the transportation of Peace River gas to serve Vancouver and the British Columbia markets alone.

On the basis of the 22c price at the International Border and the rates fixed for delivery of gas in British Columbia, the officials of Westcoast were able to negotiate the purchase of gas from the producers in the field and fix the gathered price in the field.

These gas sales agreements and gas purchase agreements had to be completed before the economic studies could be made on which the financing of the pipeline project was based.

These agreements also were required to assure the consumer in the United States of supplies of gas for at least 20 years upon terms and conditions including price which would meet the approval of the Federal Power Commission. The agreement for sale of gas at the International Border was a main factor whereby the management of the insurance companies of the United States (who were destined to provide the greater proportion of the investment in the facilities to be constructed) could recommend to their financial committees investment in Westcoast securities based solely on the merits of the proposal with respect to gas reserves and markets without the help of any government subsidy or the guarantees of international oil companies.

It will be remembered that in both the cases of the Interprovincial Pipe Lines and Trans Mountain Pipe Lines the first mortgage bonds are secured by the guarantee of the world's larger oil companies. In the case of Trans Canada Pipe Line substantial aid of the government of Canada was required before the Trans Canada venture obtained the approval of the investment committees of the insurance companies in the United States.

Following completion of the contract with Pacific Northwest in December 1954, rapid progress was made. By March 1955 Gas Purchase Contracts, Sales Contracts with distributors in Bri-

tish Columbia, and the economic studies, were completed. By June, 1955 hearings before the Board of Transport Commissioners were completed, and an export license obtained, and Pacific Northwest was enabled to proceed with its application to the Federal Power Commission.

Proceedings before the Federal Power Commision were completed in October and on November 28th, a Certificate of Convenience and Necessity was issued by the Federal Power Commission to Pacific Northwest.

It may be observed that apart from the fact that gas must compete with other fuels, the customer in the United States requires reasonable assurances of a continued supply of gas over a period of time sufficient to provide for the amortization of the investment in the facilities installed to use Canadian gas by the transmission companies, the distribution companies and the industrial and domestic consumers. Accordingly, the less new capital expenditure required to be made in market and use facilities in the United States, the more flexible terms of the delivery that may be required by the United States customer. A customer which has invested a minimum of capital in new facilities to transmit Canadian gas is more able to restrict its requirements to volumes which are currently surplus to Canadian requirements based on taking delivery of fluctuating volumes when required to satisfy peak day demands of consumers in Canada as the same should occur from time to time.

The arrangement which Westcoast has been able to make with Pacific Northwest in connection with proposed deliveries of gas from Alberta sources at the International Border near Kingsgate, British Columbia, is made possible by the limited investment by Pacific Northwest in new facilities and the ability of Pacific Northwest to fit its requirements to the peak day demands of Alberta consumers.

8

COST OF TRANSPORTATION

In describing the proposed Westcoast project to transport gas from southern and central Alberta to the Pacific Coastal States through southeastern British Columbia, under Section 9, Westcoast has submitted its estimates of the cost of construction of the proposed pipeline facilities and plant together with an estimate of the operating costs of the pipeline facilities and the plants. The details are set out in Exhibit B.

A discussion of the cost of transportation requires an understanding of the meaning of "cost" when applied to the movement of gas. Since the accounting for natural gas companies is generally done in accordance with utility concepts the term "cost of transportation" or "cost of service" is generally understood in the industry to mean the actual cost of performing a service including a reasonable earning on the investment in facilities required for the performance of the service.

Generally speaking, operating costs and administration amount to about 15 to 20 per cent of the cost of transportation while the remaining 80 to 85 per cent is related to the capital cost of the facilities involved. Both depreciation and general taxes, which are principally ad valorem taxes, are directly related to the cost of the facilities. In order for a project to be economically feasible, its operation must earn full interest charges plus net income, after income tax, sufficient to make the project financeable.

Since the Westcoast Peace River pipeline and Gas Scrubbing Plant have only been in operation since October 1, there is insufficient experience upon which to base definitive operating costs. However, for the information of the Commission, there is set out in Exhibit "C" an estimate of revenues, expenses and income for the years 1958, 1959 and 1960 as submitted to financial institutions and underwriters in support of the economic feasibility of the Westcoast project. This statement was based upon the operation of the pipeline assuming that it would take three years to build up to its initial installed capacity. No attempt was made to forecast operating results which may be reflected in increased throughputs.

9

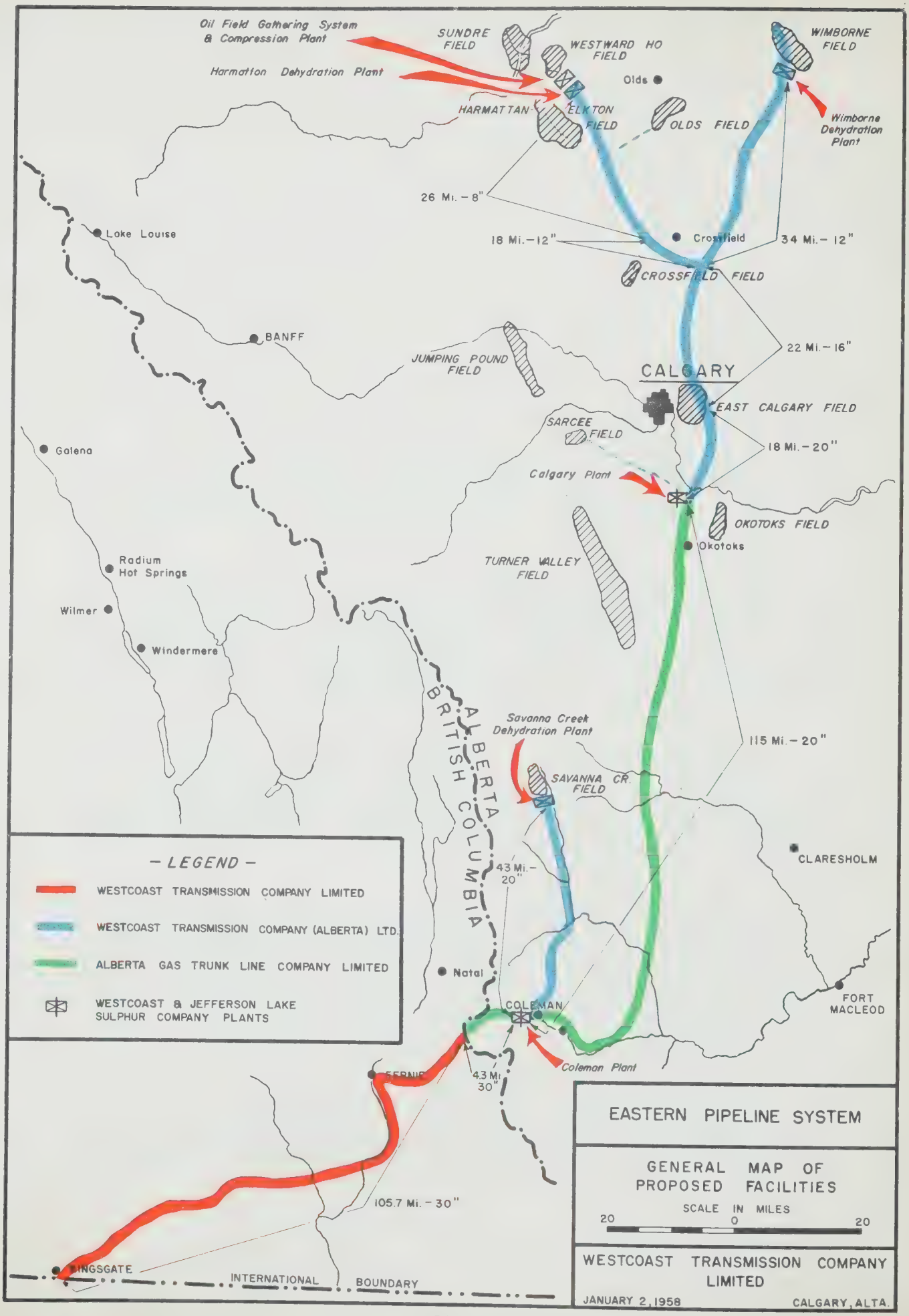
THE PROPOSED WESTCOAST PROJECT SERVING SOUTHERN AND CENTRAL ALBERTA AND SOUTHEASTERN BRITISH COLUMBIA

Westcoast has made application to the Oil and Gas Conservation Board of Alberta for a permit under The Gas Resources Preservation Act, being Chapter 19 of the Statutes of Alberta 1956, to purchase in the Province of Alberta and transmit to markets in Alberta, British Columbia and the United States a total of one trillion, three hundred billion cubic feet of natural gas during the 25-year term of the permit at a rate of not more than 55 billion cubic feet of gas in any one year nor more than 170 million cubic feet of gas in any one day.

Westcoast plans to purchase an average of 80,000 Mcf of gas per day in the Savanna Creek field and take delivery from the Calgary Processing Plant of from 50,000 to 100,000 Mcf per day as may be available after due provision at the outlet of the Plant for delivery of any gas required to supply consumers in the vicinity of the City of Calgary or on the system of the gas distributing company serving the southern Alberta area, namely, the Canadian Western Natural Gas Company Limited.

The map, page 54, shows the planned expansion of the Westcoast pipeline system to take gas from the Savanna Creek and East Calgary fields of Southern Alberta. Westcoast plans to construct a 30-inch pipeline, 105.7 miles long, from a point on the Alberta British Columbia border in the Crow's Nest Pass area to the International Boundary near Kingsgate, British Columbia. Westcoast Transmission Company (Alberta) Ltd. (Westcoast Alberta) plans to construct 43 miles of 20-inch pipe and 25.9 miles of 6 to 16-inch gathering system to deliver sour gas produced from the Savanna Creek wells to a Gas Processing Plant located in the vicinity of Coleman.

Westcoast Alberta also plans to construct a sour gas gathering system connecting the Wimborne and Harmattan-Elkton, Sundre, Westward Ho fields to a processing plant to be constructed south of Calgary. This sour gas system will comprise 31 miles of 12-inch pipe, 22 miles of 16-inch pipe, and 130 miles of 20-inch pipe, with 26 miles of 8-inch lateral to the Harmattan-Elkton area.


Oil Field Gathering System & Compression Plant
Harmatton Dehydration Plant
SUNDRE FIELD
WESTWARD HO FIELD
WIMBORNE FIELD
Olds
HARMATTAN
ELKTON FIELD
OLDS FIELD
Wimborne Dehydration Plant
26 Mi. – 8"
18 Mi. – 12"
Crossfield
34 Mi. – 12"
CROSSFIELD FIELD
Loke Louise
BANFF
JUMPING POUND FIELD
22 Mi. – 16"
CALGARY
EAST CALGARY FIELD
SARCEE FIELD
18 Mi. – 20"
Galena
Calgary Plant
OKOTOKS FIELD
Okotoks
Radium Hot Springs
TURNER VALLEY FIELD
Wilmer
Windermere
ALBERTA
BRITISH COLUMBIA
Savanna Creek Dehydration Plant
115 Mi. – 20"
SAVANNA CR. FIELD
CLARESHOLM
43 Mi. – 20"
Natal
COLEMAN
FORT MACLEOD
Coleman Plant
43 Mi. – 30"
105.7 Mi. – 30"
KINGSGATE
INTERNATIONAL BOUNDARY
– LEGEND –
WESTCOAST TRANSMISSION COMPANY LIMITED
WESTCOAST TRANSMISSION COMPANY (ALBERTA) LTD.
ALBERTA GAS TRUNK LINE COMPANY LIMITED
WESTCOAST & JEFFERSON LAKE SULPHUR COMPANY PLANTS
EASTERN PIPELINE SYSTEM
GENERAL MAP OF PROPOSED FACILITIES
SCALE IN MILES
20 0 20
WESTCOAST TRANSMISSION COMPANY LIMITED
JANUARY 2, 1958
CALGARY, ALTA.

It is proposed that Alberta Gas Trunk Line Company Limited (Trunk Line) will transport the gas purchased by Westcoast from the Calgary Processing Plant to the Coleman Plant and then transport the total volume of gas to an interconnection with the Westcoast 30-inch line at the Alberta British Columbia border.

The cost of the entire project including plants, pipelines, and gathering system, but exclusive of well drilling, is estimated at about $90,000,000. Of this amount the cost of the Coleman Plant is estimated at about $15,000,000, and the cost of the Calgary Plant at about $13,000,000.

The 30-inch pipeline planned by Westcoast will have an ultimate capacity of 660 million cubic feet per day and will provide a ready outlet for additional quantities of Canadian gas that may become surplus to the needs of the people of Alberta and Canada.

In addition to providing an outlet for surplus Canadian gas, the proposed expansion of the Westcoast project will have favorable impact upon the economy of Alberta, just as the original Westcoast project materially affected the economy of the Peace River area and British Columbia.

Gas will be made available for the first time to the communities of Coleman and Blairmore in Alberta, and Fernie, Cranbrook, Kimberley and smaller communities en route in British Columbia. The expenditure of large sums of money in drilling, pipeline contsruction and plant construction will be beneficial to the economy of southern Alberta. The two large Gas Processing Plants, one at Calgary and one at Coleman, will provide employment for many, and the sale of sulphur and hydrocarbon by-products in export markets will contribute to the flow of money into Canada. At least 8 drilling rigs will be required to complete the necessary development wells, and other exploratory drilling activity will accompany the opening up of an export market outlet from the area. In anticipation of this outlet, Westcoast and Pacific Petroleums and Associates have purchased acreage at Crown sale for over $250,000 cash and are presently spending 2 million dollars in the drilling of two deep wildcat tests of foothill structures in southern Alberta.

This program will develop the large sour gas Savanna Creek and East Calgary fields. These fields otherwise cannot be developed without an export market because large and costly plant installations are required to make gas from these and other fields in the vicinity of Calgary merchantable. Such plants can only be financed, and the fields can only be economically developed by producing large volumes of gas uniformly throughout the year. The local gas companies do not have a market demand of sufficient volume or uniformity to undertake this development themselves. Having once developed these large gas fields, Westcoast can then make the plant residue gas available to supply consumers in Alberta who otherwise could not be supplied at economic prices.

SAVANNA CREEK AGREEMENT

Westcoast has contracted with 100% of the interests in the Savanna Creek Field, namely, Phillips Petroleum Company, Northern Natural Gas Producing Company, Husky Oil and Refining Ltd., Canada Western Distributors Ltd., Anaconda Petroleums Limited, and Savanna Creek Gas and Oil Limited. This contract provides for the purchase of up to 1½ trillion cubic feet at rates up to 187,500 Mcf per day depending upon gas reserves. With the gas reserve presently developed, Westcoast expects a production of a maximum of about 100,000 Mcf per day.

The price for gas purchased at the well head is fixed in the agreement as follows:

Per Mcf of Pipeline Gas

Period	Column 1	Column 2	Column 3	Column 4
From date of first deliveries to the following next January 1st	12¢	13¢	14¢	15¢
Next 3 years	12¢	13¢	14¢	15¢
Next 1 year	12⅓¢	13⅓¢	14⅓¢	15⅓¢
Next 1 year	13⅓¢	14⅓¢	15⅓¢	16⅓¢

Thereafter the price specified in each of the above columns shall be increased by ⅓¢ per Mcf at the beginning of each year.

The prices set forth in Column 1 above shall apply to all gas sold hereunder except during such times as prices set forth in the other columns are applicable as hereinafter set forth.

The prices set forth under Column 2 above shall apply to all Gas sold hereunder:

(a) In any month of the term hereof during which the contract volume as defined in Article V hereof equals One Hundred and Fifty million cubic feet per day, or

(b) In any month of the term hereof during which daily volume of gas received into the pipeline from sources within an area within Fifty miles of the pipeline or an area within the Province of Alberta bounded on the North by the North line of Township 26, on the East by the East line of Range 22, West of the 4th Meridian and on the West by the West line of Range 8, West of the 5th Meridian, (both areas are hereinafter called 'the Area'), equals 250,000 Mcf per day but is less than 350,000 Mcf per day.

The prices set forth under Column 3 shall apply to all Gas sold hereunder:

(a) In any month of the term hereof during which the contract volume as defined in Article V hereof equals One Hundred and Fifty million cubic feet per day and during which the average daily volume of gas received into the pipeline from sources within the Area, equals 300,000 Mcf per day but is less than 400,000 Mcf per day.

(b) In any month of the term hereof during which the average daily volume of gas received into the pipeline from sources within the Area, equals 350,000 Mcf per day but is less than 400,000 Mcf per day.

The prices set forth under Column 4 above shall apply to all Gas sold hereunder:

(a) In any month of the term hereof during the average daily volume of gas received into the pipeline from sources within the Area, equals 400,000 Mcf per day or greater."

COLEMAN PLANT AGREEMENT

Under date of June 3, 1957 Westcoast Transmission Company Limited and Jefferson Lake Sulphur Company entered into an agreement for the joint ownership and operation of a Gas Processing Plant to process gas produced from the Savanna Creek field. The site of this Plant has been selected at Coleman.

EAST CALGARY FIELD AGREEMENT

Agreements have been reached with Jefferson Lake Sulphur Company under dates of June 18, 1957 and July 3, 1957; and with Merrill Petroleums Ltd. under date of August 1, 1957 for the purchase of up to 1 trillion cubic feet of gas at rates up to 125 million cubic feet per day from the East Calgary field, depending upon reserves. With the gas reserves presently, developed, Westcoast expects to take 56 million cubic feet per day.

The price for the gas at the outlet of the Processing Plant is fixed in the Agreement as follows:

"First year: 14c
Second year: 14½c
Third year 15c
Fourth year: 15¼c

And each year thereafter commencing with the Fifth year up to and including the Twentieth year of deliveries, the said price of 15¼c shall be progressively increased at the rate of ¼c per year."

WIMBORNE, HARMATTAN - ELKTON AREAS PROPOSAL

As noted above, the application of Westcoast contemplates the construction of a large diameter pipeline system to export initially a relatively small volume of gas surplus to Alberta requirements. The facilities to be constructed will provide an outlet for over 660,000 Mcf per day. As additional volumes of gas become surplus to Alberta requirments, Westcoast is in a position to purchase such volumes, and by virtue of having originally constructed such large capacity facilities, can economically market such gas in the United States.

Arising out of its consideration of the problem of meeting the gas requirements of the city of Calgary, Westcoast proposes to make use of this additional pipeline capacity so that additional gas production in the Wimborne and Harmattan-Elkton Areas may be developed. In the intial stages of production this gas can be marketed by Westcoast through delivery to its United States customer under terms reserving therefrom volumes that may be needed to supply peak load requirements of the City of Calgary. The cost of the gas so supplied to the City of Calgary will be reasonable as indicated by the calculation of estimated costs submitted in Exhibit B.

As shown on the map, page 54, Westcoast proposes the construction of a sour gas gathering system from the Wimborne and Harmattan-Elkton areas passing adjacent to the Olds, Crossfield and East Calgary fields. The sour gas would be gathered to a suitable plant site south of Calgary near a water supply and on rail transportation where the gas would be processed. Gas from the Sarcee and Okotoks fields could also be conveniently processed in the same plant.

Westcoast has offered to purchase gas from Wimborne and the Harmattan-Elkton area and to provide an immediate high volume, high load factor market. The majority of the producers in the Wimborne field have indicated their approval of the Westcoast proposal, subject to completion of definative agreements and the issue of the required approvals from the Oil and Gas Conservation Board. Producers in the Harmattan-Elkton-Sundre-Westward Ho area have reserved their decision pending completion of engineering studies with respect to the use of the gas produced in the field for repressuring or recycling.

Westcoast proposes to purchase high pressure raw gas at the wellhead at Wimborne and compressed and gathered gas at a central point in the Harmattan-Elkton, Westward Ho, Sundre area and to pay prices starting at 12c per Mcf of residue gas and escalating upward plus 20 per cent of recovered hydrocarbon by-products. The plan assumes that the Wimborne operators will be authorized to operate the field as a gassy oil field. This assumption is supported by studies of Westcoast Engineers. Westcoast has offered to instal and operate the Harmattan-Elkton field gathering and compression facilities for the producers on a utility rate of return basis.

In addition to making gas available for the future use by local consumers and supplying a present export market, the plan offers a means to conserve oil field gas which otherwise may be wasted.

The economics of carrying out this plan along with the basic plan of Westcoast as set forth in its application of July 1957 to the Oil and Gas Conservation Board is fully described in Exhibit B.

CALGARY PROCESSING PLANT

The plant to be constructed at Calgary will have an intial peak day capacity of 139.6 MMcf per day of sour natural gas to supply 114.7 MMcf per day of dry and sweet natural gas (both measured at 14.4 psia and 60° F.) for delivery to Westcoast's 30-inch transmission system, and to produce a maximum of 499 long tons of sulphur per day. The facilities will be designed to permit expansion as required to process increasing volumes.

The raw gas, to be received at the plant, is estimated to contain 10.02 per cent hydrogen sulphide which must be removed to provide a merchantable specification pipe line gas.

The details of gas analysis, estimated capital cost and estimated operating costs are set forth in Exhibit B.

Westcoast and Jefferson Lake Sulphur Company propose to construct and operate the Gas Processing Plant as partners sharing equally in the construction costs, operating costs and revenue from the sale of sulphur. The Westcoast share in the operating profit or loss, as the case may be, will be credited or debited on a cost of service basis to the operation of the proposed sour gas pipeline system.

PACIFIC NORTHWEST AGREEMENT

This Agreement of May 25, 1957 between Westcoast Transmission Company Limited and Pacific Northwest Pipeline Corporation provides for the sale of 150 million cubic feet per day at Kingsgate, British Columbia. Under date of December 9, 1957 this Agreement has been supplemented to provide that the price of gas at the International Border shall not be less than the full cost of service incurred by Westcoast in purchasing and transporting the gas to the International Border.

INLAND NATURAL GAS CO. LTD. - LETTER OF INTENT

Under date of July 29, 1957 Inland Natural Gas Co. Ltd. indicated its intention to furnish distribution services from the Westcoast pipeline to adjacent communities in southeastern British Columbia.

GAS SALES AGREEMENT TO MEET ALBERTA REQUIREMENTS

Pursuant to the provisions of The Gas Resources Preservation Act Westcoast Transmission Company Limited is prepared through its subsidiary, Westcoast Alberta, to make available from gas supplies under contract to it from time to time, such volumes of gas as reasonably may be required to meet demands of consumers in the southwestern and central parts of the Province of Alberta which cannot be supplied by the Company or Companies distributing gas in such area. The sale of such gas will be carried out as an integral part of the operations of Westcoast in the same manner as sales of gas by it to its customers in British Columbia and the United States.

It is planned that the gas for local use will be transported by the Alberta Gas Trunk Line Company Limited.

ALBERTA GAS TRUNK LINE LETTER

By letter dated July 31, 1957 Alberta Gas Trunk Line informed Westcoast that it would apply for the necessary authorizations and undertake the construction of the necessary facilities to transport within Alberta gas required by the expansion program of Westcoast upon a cost of service basis to be agreed upon.

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GAS SUPPLY FOR CITY OF CALGARY

The data in Exhibit B to this submission is presented to the Commission to illustrate the economics which require consideration in the construction of a pipeline project and particularly to illustrate the problems concerned in gathering and distributing gas within the Province of Alberta.

The material submitted has reference to the City of Calgary since it is the southern and central part of the area of the province from which Westcoast proposes to take delivery of gas for export as above set forth. Reference is made to "Illustrative Deliverability Schedules for the Supply of Local Requirements — Area Tributary to Canadian Western Natural Gas System" set out in Exhibit B. These schedules show in detail a method under which deliverable gas from various fields are allocated so that over the years an economic supply of gas can be provided, and by economic is meant economic on behalf of the producer of the gas, economic in regard to the gathering, transmission and treating of gas, and economic in price to Alberta consumers.

As other submissions will have indicated, the most important factor which affects the availability of gas and the cost of gas to Alberta consumers is the fact that large volumes of gas are required during the cold winter days and only minor quantities of gas are required during the summer months. This problem is one which can be met first by utilizing storage, and second, by utilizing facilities made available through the sale of gas in the export markets. The latter method is by far the more important in an area of expanding reserves, having regard to the long term benefits to the people of Calgary, the Province of Alberta and Canada as a whole.

The attention of the Commission is particularly drawn to the fact that in the above mentioned illustrative deliverabilities it is assumed that the additional storage facilities will be provided through the development of the Carbon ~~oil and~~ gas field east of the City of Calgary as proposed by the Canadian Western Natural Gas Company Limited. The Engineers of Westcoast are of the opinion that this storage proposal is a logical development and will be of great assistance in providing a supply of gas to meet peak load demands of the city of Calgary over the years to come at a reasonable cost.

11

CONCLUSION

Many of the factors bearing on the question of policy to be adopted with respect to the export of natural gas having regard to the interest of consumers in all Canada, have been under consideration in the Province of Alberta since 1949, when the Legislature of Alberta enacted The Gas Resources Preservation Act.

After the experience gained in Alberta from 1949 to 1956, the Legislature of Alberta revised its direction to the Oil and Gas Conservation Board with respect to the public interest in the export of gas from the Province of Alberta.

Section 7, Subsection (3) of The Gas Resources Preservation Act 1956, reads as follows:—

"(3) The Board shall not grant a permit for the removal of any gas from the Province unless in its opinion it is in the public interest to do so having regard to

(a) the present and future needs of persons within the Province, and

(b) the established reserves and the trends in growth and discovery of reserves of gas in the Province."

The Oil and Gas Conservation Board of Alberta is therefore directed to give consideration to the trends in growth and discovery of resources of gas in the Province.

It is submitted that any consideration of the future needs of consumers in Canada should be related to the trends in growth and discovery of reserves of gas in Canada as a whole. Accordingly, the national policy should be so constituted as to take into account those factors which will maintain continued aggressive gas exploration and development programs with respect to gas reserves in Canada. Two factors, it is submitted, are of vital importance in this connection, namely, potential markets and the price of gas in the field.

POTENTIAL MARKETS RELATED TO TREND OF GAS DISCOVERY

The submissions to the Commission indicate the existence of tremendous potential volumes of gas in the Western Sedimentary Basin. This gas only becomes an asset to Canada and a contribution to the national economy provided it is discovered, produced and marketed.

It is submitted that the market demand based on satisfying requirements of Canadian consumers alone, will not provide the incentive required to induce exploration for and development of this potential natural resource. The only markets which will create this demand are the export markets in the United States.

The potential market demand created by a policy which favors export of gas surplus to the requirements of Canadian consumers, is the factor which will influence the drilling of step-out or development wells required to evaluate prospective gas producing structures which have been discovered by initial exploratory operations. Even at this date there are a great many discovery wells in Alberta and British Columbia which have indicated potential gas producing structures but because of the lack of potential market, further drilling has not been continued. As soon as the owners of such structures are assured that a market will be available for the gas which may be proved up in such structures, they will be justified in proceeding with the drilling of step-out and development wells. The drilling of these step-out and development wells can be expected to establish ever increasing gas reserves, which then can be utilized to satisfy the potential increasing market demands.

PRICE OF GAS IN THE FIELD RELATED TO TREND OF GAS DISCOVERY

It is only in recent years that the field price of natural gas has been fixed by the application of the same economic standard applied in fixing the price of other commodities of general consumption, that is to say, that the costs incurred in finding and producing gas have been taken into account along with the demand for gas and the price which it commands in the markets in which it is consumed.

This is particularly so in connection with recent contracts entered into between producers and the pipeline companies serving markets in the eastern United States. These contracts have taken into account the extraordinary expenditure required in offshore drilling in the Gulf of Mexico and the prices which industry is prepared to pay in large centres of population for gas delivered at plant gates.

The impact of these economic factors on the pricing of natural gas will be felt more and more by consumers of gas both in Canada and the United States since present consumers have been purchasing gas at prices based upon the sale of gas as a surplus commodity produced along with oil and delivered to pipeline companies at nominal prices as an alternative to flaring the gas. Nowhere is this situation better illustrated than in the gas supplied to the City of Calgary from Turner Valley from 1921 to 1945 when the gas was sold at the nominal price of 2c per Mcf and and about a trillion cubic feet of gas was flared in order to permit the production of condensate and oil. In 1947 the price of gas in the field was fixed at 4¾c. This price was authorized by the Natural Gas Commission as part of a scheme of Conservation. This was the first instance where gas produced in an oil field was given recognition in Alberta as having an economic value in itself.

In general, there is no reason why the price of gas in the field will not be fixed by the same economic principles applicable to other mineral products, namely, the competitive value of the product at the point of consumption less the cost of transportation. If the field price is sufficient to justify incurring the risks of exploration and the costs of development drilling and operation, increasing supplies of gas will be made available.

At the present time there is a substantial demand for Canadian gas in the United States markets at prices which will warrant continued exploration and development by producers in Canada. This market should be secured so that this development can be carried out on an economic basis. If this market is not now served it may be lost because of the introduction of competitive fuels at the points of consumption which may establish prices that will not justify exploration and development costs in Canada and result in the loss of the economic utilization of this natural resource.

OIL FIELD GAS MUST BE MARKETED

In general, the greater part of natural gas discovered to date in Canada has been gas associated with oil and in solution in oil which must be produced as a part of an oil field operation or an oil-gas field operation.

Since the conservation of gas is recognized by all concerned as a sound principle, it follows that unless gas produced with oil is marketed on a reasonable basis that the principle of conservation must be departed from and the gas wasted or the production of oil prohibited. There are numbers of illustrations of this situation in the Province of Alberta, today, namely, Leduc Field, Redwater Field, and Pembina Field.

In its submission with respect to supplying gas to the City of Calgary Westcoast has illustrated the method whereby the utilization of oil field gas for export purposes subject to such gas being available when required to meet local peak day demands, is very much in the interests of Canadian consumers.

EXPORT REDUCES CANADIAN TRANSPORTATION COSTS

In describing the Westcoast project it has been shown that the delivery of Peace River gas to the Vancouver area at economic prices is made possible by the transportation of the large volumes of gas required for the export market served by the Westcoast system. There would appear to be no question that, as from time to time in the future, large volumes of gas are transported to export markets, the pipelines carrying such gas will at the same time supply Canadian consumers en route with gas at costs much lower than if the smaller Canadian market were to be satisfied from the same sources of supply.

The Story of a Pipeline

COMPLETION of Westcoast Transmission Company's pipeline through rugged British Columbia has been a major event in Western Canadian history.

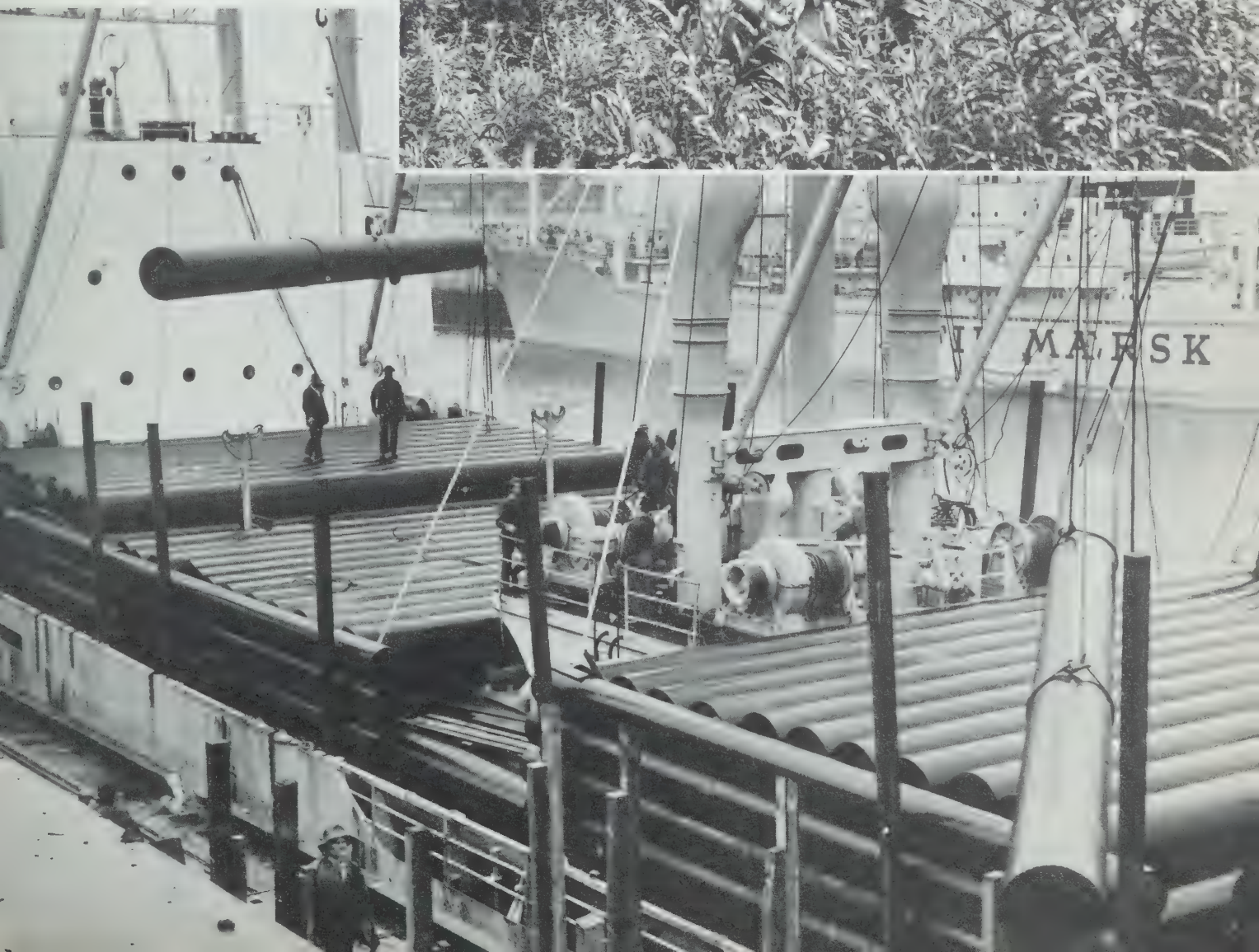
Years of planning and hearings were necessary before construction could commence on this project which has opened up the North and brought new industries and payrolls to Canada.

Building of the line from the Peace River area down through British Columbia was costly, complex and difficult. But it was completed in the record time of two construction seasons.

Some of the highlights of this construction are pictured on the following pages.

Surveyors chart the route of the Westcoast pipeline through British Columbia's rugged coastal mountains prior to the start of construction.

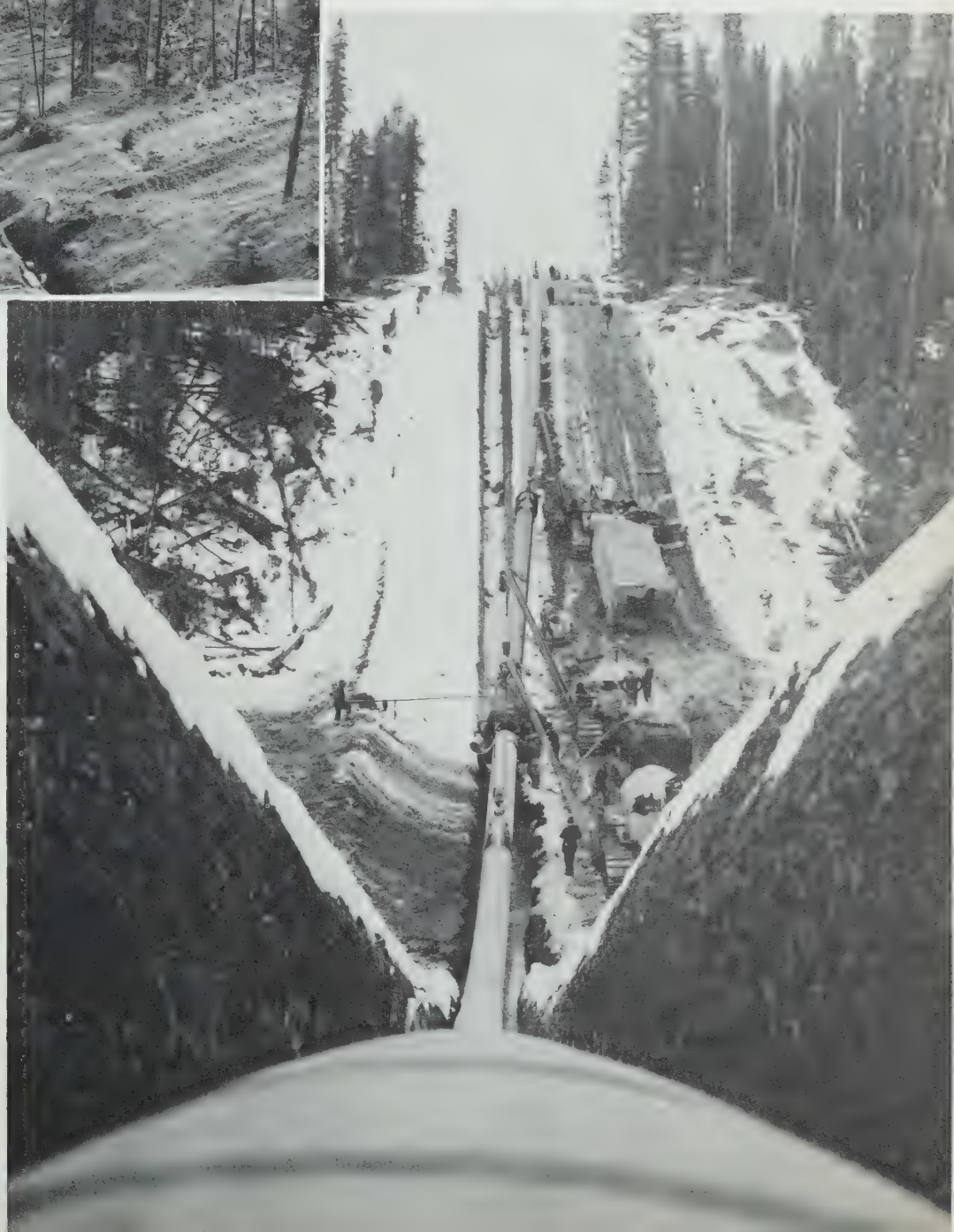
The first shipload of 30-inch diameter pipe for the line arrives in Vancouver from England. The Westcoast pipe purchase was the largest single offshore order that Great Britain had received since the war.



The steel pipe is moved to location along the pipeline right-of-way. Movement of pipe and materials and the general stimulus to business resulting from West-coast construction was one of the main factors in enabling the extension of the Pacific Great Eastern Railway into the Peace River area.

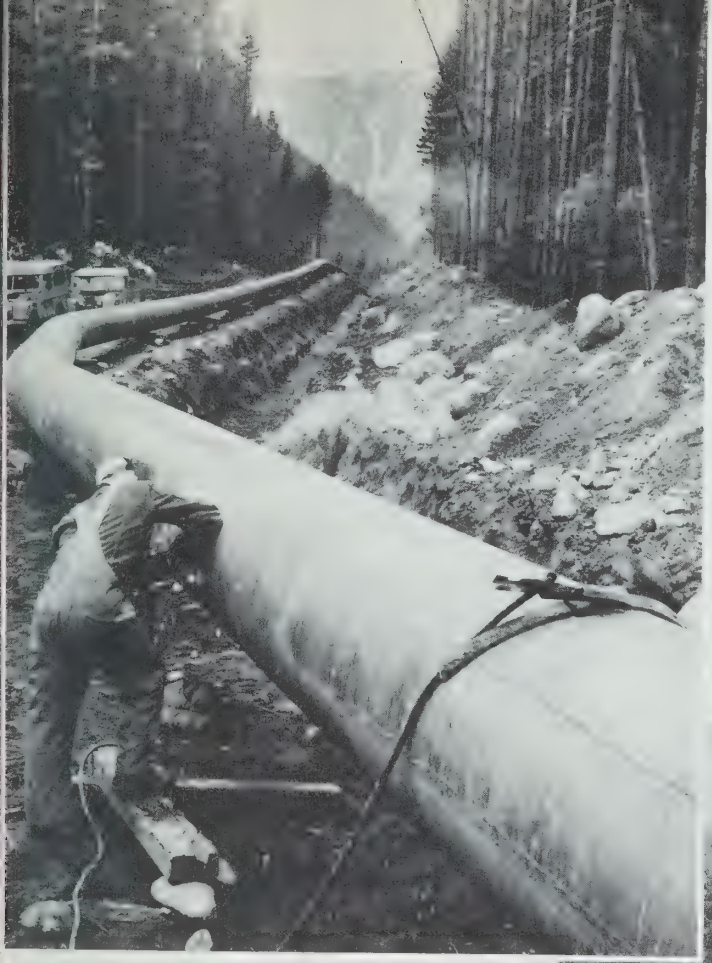
Pipeline right-of-way was cleared and trenched, following which the 40-foot pipe lengths were "strung" along the route. Here pipe is ready for welding in the Coquihalla Pass in the southwestern B.C. mountains.

Westcoast pipeline is lowered in near Quesnel in central British Columbia. The gas pipeline has brought new power and fuel for the lumber industries in the rich forest and farmlands in this section of the province.



Pipe laying proceeds in the early winter snows through the Pine Pass in the Rocky Mountains. Here pipe is being coated and wrapped in a rush to complete construction as soon as possible.

Low water in the winter season enables the pipeliners to trench and lower-in pipe in B.C. rivers. Here a section of the 30-inch pipe, wrapped and weighted, is being put in place across the Coquihalla River.



A welder makes final "pass" at the pipe before it is trenched. This rough terrain scarcely slowed the Westcoast pipeliners.

Pipe is carefully bent to follow the route laid out by engineers. Picture shows the Westcoast pipe being wrapped and laid during the winter in B.C.'s lower Fraser Valley.

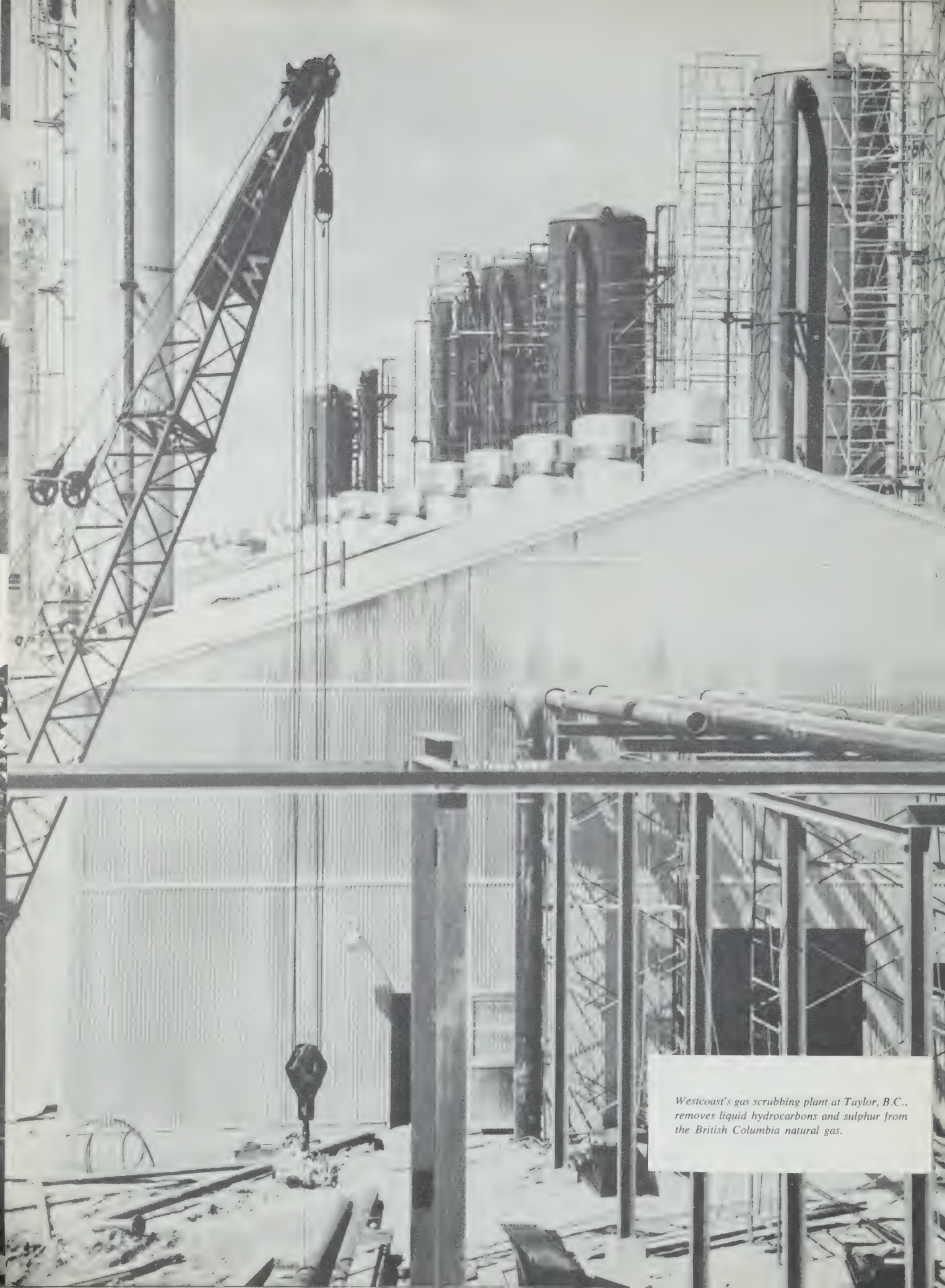
Protection against corrosive action in the soil, movement and rust is provided by wrapping and coating the pipe. Here workmen start the automatic coat-and-wrap machine prior to laying pipe in rocky bench-land near Merritt, B.C.

Canada's largest span carries the Westcoast pipeline across the Peace River at Taylor, B.C. The bridge, 1,675 feet between pillars, carries Alberta gas to the McMahon plant at Taylor where it merges with B.C. gas and enters the 30 inch main line for its journey through British Columbia.

Westcoast pipeline is strung underneath the Agassiz-Rosedale Bridge in the Fraser Valley 70 miles north of Vancouver.

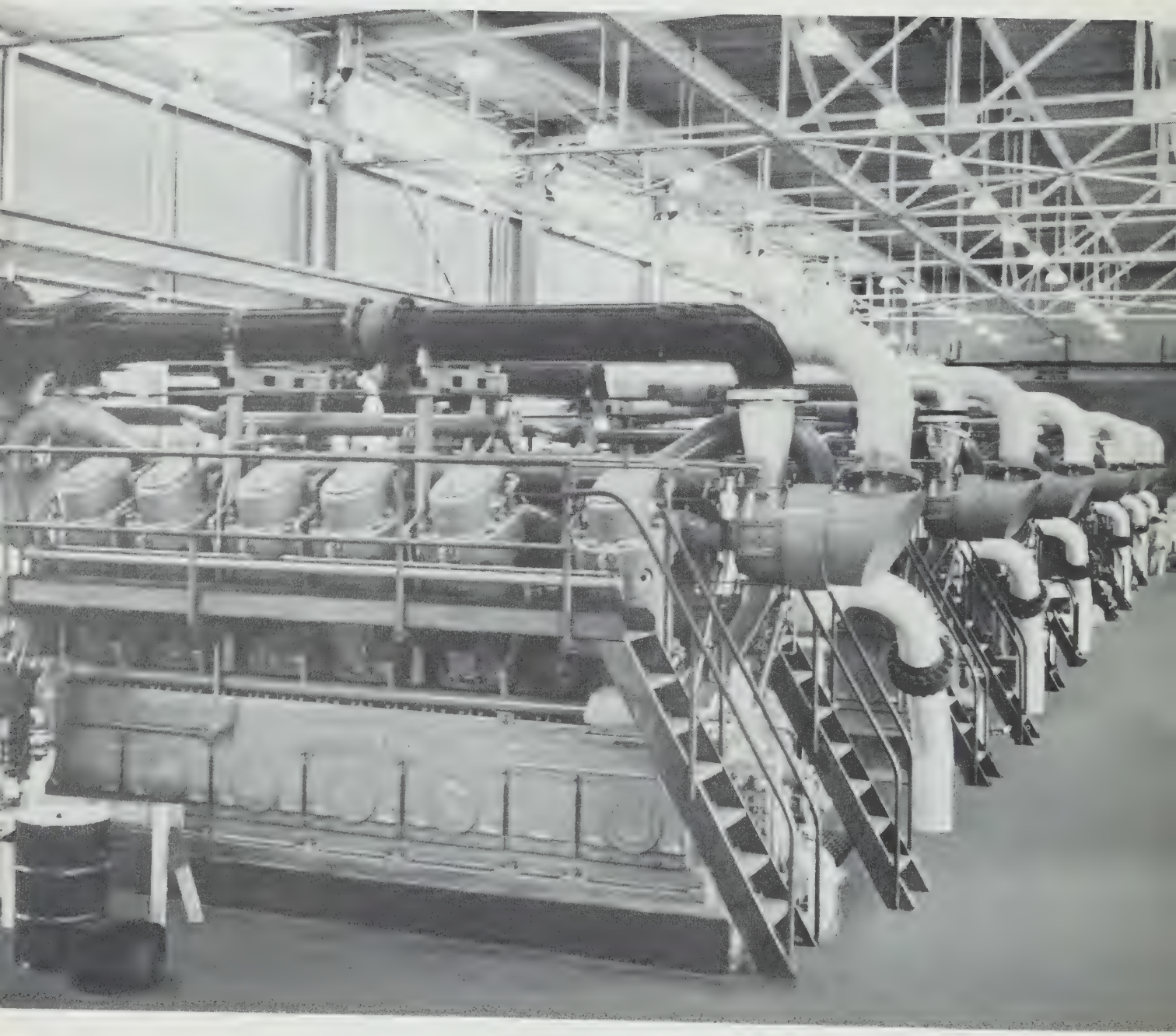
Compressor stations located approximately 160 miles apart provide the power to push the gas through the pipeline. Here is station No. 5 at Australian, B.C. Westcoast has built fine homes at these stations for personnel, and around the stations, in once isolated sections of the province, modern communities are already springing up.

Taylor, B.C., where gas from British Columbia and Alberta fields is united before moving to markets is shown here. Compressor station No. 1 is in background.



Westcoast's gas scrubbing plant at Taylor, B.C., removes liquid hydrocarbons and sulphur from the British Columbia natural gas.

New payrolls, new industries and new communities follow the development of the natural gas industries. A few of the modern homes built to house Westcoast's personnel are pictured.



Compressor Station No. 1 at Taylor has installed six engines of 2000 horsepower each, which pump gas into the main line.

CAPITAL STRUCTURE

A statement of the capital structure of Westcoast Transmission Company Limited (for the purpose of this appendix called the "Company") as of November 30, 1957, is summarized as follows:

LONG TERM DEBT

	Authorized and Issued United States dollars	Canadian dollars
First Mortgage Pipe Line Bonds, 4⅜% Series (Series A) due November 1, 1977	$83,000,000	$ 80,347,812
First Mortgage Pipe Line Bonds, 5% Series (Series B) due November 1, 1969	9,150,000	8,743,969
3½% Debentures, maturing $1,050,000* semi-annually from May 1, 1959 to November 1, 1963		10,500,000
3½% Notes maturing $1,900,000* semi-annually from May 1, 1959 to November 1, 1963	19,000,000	18,768,437
4¼% Notes maturing $875,000 semi-annually from May 2, 1960 to November 1, 1961	3,500,000	3,348,516
Thirty-two year 5½% Subordinate Debentures Series A, due April 1, 1988	20,500,000	20,405,667
5½% Subordinate Debentures, Series B, due April 1 1988	3,100,000	2,970,188
5½% Subordinate Debentures, Series C, due April 1, 1988, convertible into shares of capital stock of the Company at $35.00 U.S. per share if converted on or before September 1, 1967 and at $38.50 U.S. per share if converted thereafter and on or before July 15, 1978	25,000,000	24,031,250
		$169,115,839

CAPITAL STOCK

Authorized—25,000,000 shares without nominal or par value		
Issued— 4,825,390 shares for cash	$23,112,469	
—1,077,915 shares for acquisition of property	25,869,960	48,982,429
		$218,098,268

* Except that commencing May 1, 1962, additional semi-annual payments of $203,550 (Canadian) on the Debentures and $368,325 (U.S.) on the 3½% Notes will be due, thereby reducing the final payment accordingly.

The foregoing listing is in order of priority, except that the Company's 3½% Debentures, 3½% Notes and 4¼% Notes rank equally.

The long-term debt and capital stock sold in United States funds have been converted at the exchange rate in effect at the respective dates of sales.

One of the Company's wholly-owned subsidiaries, Westcoast Transmission Company (Alberta) Ltd., has issued $1,650,000 (U.S.) principal amount of First Mortgage Pipe Line Bonds, 4⅜% Series (Series A), to November 30, 1957. As required by the mortgage, all of these bonds have been purchased by Westcoast Transmission Company Limited and are pledged with the trustee of the Company's First Mortgage Pipe Line Bonds.

The interest on the First Mortgage Bonds is payable semi-annually on the 1st day of May and the 1st day of November in each year. The Company is obligated to make semi-annual cash sinking fund payments to retire $2,950,000 (U.S.) principal amount of the Bonds of 4⅜½ Series on May 1 and November 1 in each year beginning in 1964 and continuing through May 1, 1977, leaving $3,350,000 (U.S.) principal amount of Bonds of 4⅜% Series to be retired at maturity. The Company is also obligated to make semi- annual sinking fund payments to retire $700,000 (U.S.) principal amount of Bonds of 5% Series on May 1 and November 1 in each year beginning in November 1, 1963 and continuing through May 1, 1969, leaving $750,000 (U.S.) principal amount of Bonds of 5% Series to be retired at maturity.

The Bonds of 4⅜% Series may be redeemed in whole at any time or in part from time to time by the Company for any purpose other than the sinking fund or refinancing at premiums ranging from 4⅜% if redeemed on or before November 1, 1960 to ⅜% if redeemed after November 1, 1975 and on or before November 1, 1976 and at par thereafter. In the event that the Bonds of 4⅜% Series are called for the purpose of refinancing at an interest rate less than 4⅜%, the Company must pay a premium ranging from 15% if redeemed on or before November 1, 1964, to ½% if redeemed after November 1, 1975 and on or before November 1, 1976 and at par thereafter.

The Bonds of 5% Series may be redeemed in whole at any time or in part from time to time by the Company for any purpose other than the sinking fund or refinancing at premiums ranging from 5% if redeemed on or before November 1, 1960 to 1% if redeemed after November 1. 1967 and on or before November 1, 1968, and at par thereafter. The First Mortgage provides that no redemption of Bonds of 5% Series may be carried out directly or indirectly as a part of, or in anticipation of, any refunding operation involving the incurring of indebtedness by the Company or any affiliate thereof.

The interest on the 3½% Notes, 3½% Debentures and 4¼% Notes is payable quarterly on the 1st day of February, May, August and November of each year.

The Subordinate Debentures of all Series bearing interest at 5%½ per annum, payable on the 1st day of April and October, in each year are expressly subordinated in right of payment to all Senior Indebtedness at any time issued. Senior Indebtedness is defined as all indebtedness of the Company for money borrowed by the Company (other than the Subordinate Debentures) or money borrowed by others, repayment of which is guaranteed or assured by the Company, unless by the terms of the instrument financing or creating such indebtedness it is provided that the same is not Senior Indebtedness and is not superior in right of payment to the Subordinate Debentures.

The interest on the Subordinate Debentures after November 1, 1958, and so long as any of the initial Senior Indebtedness is outstanding, is payable on the first day of April and the first day of October in each year, but only to the extent to which payment on such days is in fact made pursuant to authorization by the Board of Directors, any accrued unpaid interest to be payable when the principal of such Debentures becomes due, except that if at any time accrued unpaid interest shall amount to eight full semi-annual installments of interest, all such accrued unpaid interest then becomes immediately due and payable and further accrued interest (at the above rate) will thereafter become due and payable on the first day of April and the first day of October in each year until the payment in full of all interest so becoming due and payable, and, upon payment of all interest which shall have become due and payable by reason of this exception, inter-

est will thereafter become due and payable only to the extent to which payment is in fact made pursuant to such authorization (subject again to such exception in case the accured unpaid interest at any time amounts to eight full semi-annual installments).

The Company is obligated to pay, provided that such payment would not constitute a violation of the terms of the First Mortgage, as a sinking fund on or before August 20 in each of the years 1978 to 1987 inclusive, a sum sufficient to redeem on the following October 1 at the redemption price of 100% of the principal amount of Series C Debentures so redeemed, plus interest to the redemption date. Series C Debentures in an aggregate principal amount equal to 9-1/11% (to the nearest multiple of $1,000) of an amount equal to (i) the aggregate principal amount of Series C Debentures authenticated for original issue less (ii) the aggregate principal amount of Series C Debentures previously converted pursuant to the conversion provisions hereinafter referred to, but not in excess of the following amounts, respectively:

Year	Principal Amount (U.S.)
1978	$ 750,000
1979 to 1987, inclusive	1,875,000

Subject to simliar conditions as stated above with respect to sinking fund payments relating to the Series C Debentures, the Company is required to make sinking fund payments with respect to the Series A Debentures on or before August 20, 1969 and on or before each August 20 thereafter sufficient to redeem at the redemption price of 100% of the principal amount thereof, plus interest to the redemption date, Series A Debentures in the following principal amounts, respectively:

Year	Principal Amount (U.S.)
1969 to 1973 inclusive	$ 410,000
1974 to 1978 inclusive	615,000
1979 to 1987 inclusive	1,537,500

and sinking fund payments with respect to the Series B Debentures on or before August 20, 1969 and on or before each August 20 thereafter sufficient to redeem at the redemption price of 100% of the principal amount thereof, plus interest to the redemption date Series B Debentures in the following principal amounts, respectively:

Year	Principal Amount (U.S.)
1969 to 1973 inclusive	$ 62,000
1974 to 1978 inclusive	93,000
1979 to 1987 inclusive	232,500

If the Sinking Fund Net Income for any fiscal year shall be insufficient to make the sinking fund payments for the Series A Debentures, the Series B Debentures and the Series C Debentures the available Sinking Fund Net Income for such fiscal year is to be allocated among the three series (or such thereof as may be outstanding) in the proportion of $20,500,000 (U.S.) for the Series A Debentures, $3,100,000 (U.S.) for the Series B Debentures and, for the Series C Debentures, $25,000,000 (U.S.) less the aggregate principal amount thereof previously converted into shares of Capital Stock. In lieu of paying cash to the sinking fund for any series of Debentures, the Company may surrender Debentures of such series or may certify to the redemption of Debentures of such series outside the sinking fund.

The Series C Debentures are convertible at the option of the holders at any time on or before July 15, 1978, into shares of Capital Stock at the conversion price of $35.00 (U.S.) per share if converted on or before September 1, 1967, and $38.50 (U.S.) if converted thereafter and on or before July 15, 1978, except that if any Series C Debenture is called for redemption, the right to convert will expire at the close of business on the tenth day prior to the redemption date. unless default is made in the payment of the redemption price. The conversion price is subject to adjustment in certain events to prevent dilution.

So long as the Voting Trust Agreement described herein under the heading "Voting Trust" is in effect, shares of Capital Stock issuable upon conversion, or in exchange for scrip issued on conversion, of the Series C Debentures will be deposited thereunder and Voting Trust Certificates will be issued to the Debenture holder in lieu of certificates for Capital Stock.

VOTING TRUST

3,893,657 of the presently issued shares of Capital Stock, as of November 30, 1957, are held under a Voting Trust Agreement dated as of May 9, 1955.

The Voting Trustees under the Voting Trust Agreement hereinafter described are:

Name	Address
Frank M. McMahon	Pacific Building, Calgary, Alberta, Canada
George L. McMahon	Pacific Building, Calgary, Alberta, Canada
D. P. McDonald	Pacific Building, Calgary, Alberta, Canada
Norman R. Whittall	424 Burrard Street, Vancouver, B.C., Canada
Lloyd S. Gilmour	15 Broad Street, New York, N.Y.
Edward T. Herndon	15 Broad Street, New York, N.Y.

All of the above, except Mr. Herndon, are directors of the Company.

The Agreement by its terms terminates on May 1, 1970 but may be sooner terminated by the dissolution or liquidation of the Company, the unanimous consent of the Voting Trustees or the vote of the holders of Voting Trust Certificates representing at least three-fourths of the shares of Capital Stock deposited under the Voting Trust. By a similiar vote of the holders of Voting Trust Certificates, taken prior to May 1, 1970, the term of the Agreement may be extended or renewed. Any holder of shares of Capital Stock may deposit his shares under the Voting Trust Agreement.

All of the shares of Capital Stock held under the Voting Trust Agreement are deposited with Montreal Trust Company as designated Depository. The Voting Trustees are entitled to exercise in their sole and absolute discretion, all shareholders' rights of every kind and without limitation in respect of all shares deposited under the Voting Trust Agreement, including the right to vote and to take part in or consent to any corporate or shareholders' action.

The Voting Trustees act by decision of a majority thereof at the time in office. Any Trustee may be a director or an officer of the Company and may vote for himself as such, and no person is disqualifed from acting as a Trustee by reason of personal interest, direct or indirect, in the Company or its securities. Any Voting Trustee may hold, purchase, sell or deal with Voting Trust Certificates or in securities of the Company to the same extent as if he were not such a Trustee.

The Voting Trustees shall not be entitled to remuneration for acting as such. No expense, obligation or liability of the Depository or the Trustees is chargeable to the holders of Voting Trust, which including the fees of the Depository, are payable by the Company.

Any Voting Trustee may resign on one month's notice. In the event of the death, resignation, removal or inability to act of any such Trustee or successor trustee, the vacany shall be filled by written designation as follows: (a) In the case of Lloyd S. Gilmour and Edward T. Herndon, or their successors, by the remaining one or his successor or (b) in the case of Frank McMahon, George L. McMahon, D. P. McDonald and Norman R. Whittall or their successors, by the remaining three or their successors, provided the person designated in such case must be a Canadian citizen. The Voting Trust Agreement provides that any Voting Trustee may be removed by the unanimous vote of the other Trustees.

In the event a vacancy among the Voting Trustees exists, the remaining Trustees have full power to act.

The Agreement provides that the Depository shall, upon receipt thereof, pay to the holders of Voting Trust Certificates all amounts received by it as dividends or distributions in cash or property, other than shares of voting capital stock of the Company, on the shares held in the Voting Trust, less any income or other taxes which may be required by law to be deducted, provided that the Depository, with the approval of the Voting Truestees, may direct the Company to pay such cash dividends or distributions directly to the holders of Voting Certificates.

TRILLION CUBIC FEET ENERGY EQUIVALENT

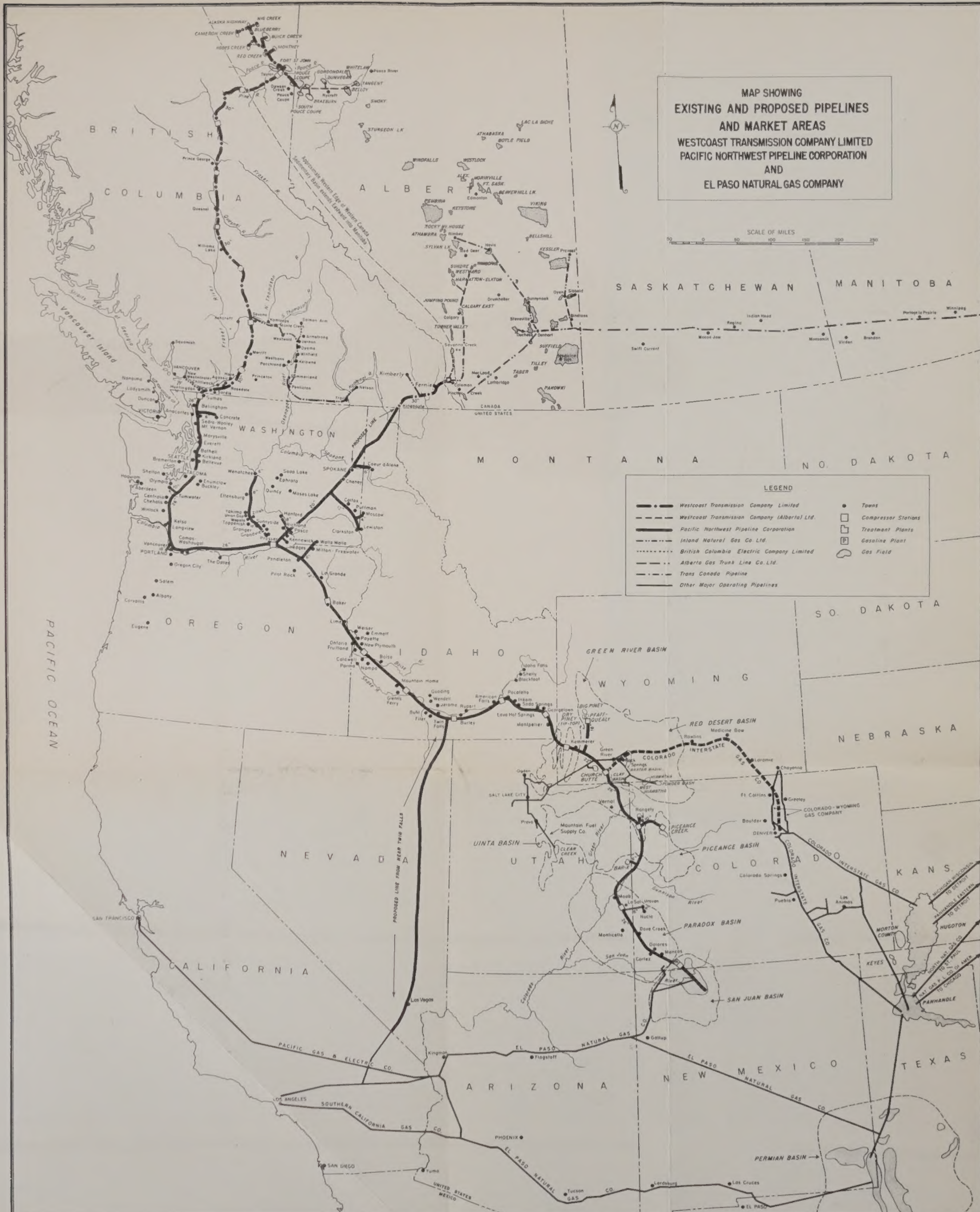
A Trillion Cubic Feet of natural gas with a Btu content of 1,000 Btu's per cu. ft. equals in energy:

(1) 41,700,000 tons of coal (containing 12,000 Btu per lb.) or 835,000 carloads of coal (50 tons per car.

(2) The output of a 100,000 KW generating plant operating at an 80% load factor for 420 years.

(3) The 1956 rate of natural gas consumption of the Province of Alberta for nearly 10 years.

(4) 170 million barrels of oil.


MAP SHOWING
EXISTING AND PROPOSED PIPELINES
AND MARKET AREAS
WESTCOAST TRANSMISSION COMPANY LIMITED
PACIFIC NORTHWEST PIPELINE CORPORATION
AND
EL PASO NATURAL GAS COMPANY
SCALE OF MILES
LEGEND
Westcoast Transmission Company Limited
Westcoast Transmission Company (Alberta) Ltd.
Pacific Northwest Pipeline Corporation
Inland Natural Gas Co. Ltd.
British Columbia Electric Company Limited
Alberta Gas Trunk Line Co. Ltd.
Trans Canada Pipeline
Other Major Operating Pipelines
Towns
Compressor Stations
Treatment Plants
Gasoline Plant
Gas Field
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
WASHINGTON
MONTANA
NO. DAKOTA
SO. DAKOTA
OREGON
IDAHO
WYOMING
NEBRASKA
NEVADA
UTAH
COLORADO
KANS.
CALIFORNIA
ARIZONA
NEW MEXICO
TEXAS
PACIFIC OCEAN
Vancouver Island
CANADA
UNITED STATES
PROPOSED LINE
PROPOSED LINE FROM NEAR TWIN FALLS
GREEN RIVER BASIN
RED DESERT BASIN
UINTA BASIN
PICEANCE BASIN
PARADOX BASIN
SAN JUAN BASIN
PERMIAN BASIN
HUGOTON
PANHANDLE
COLORADO - WYOMING GAS COMPANY
COLORADO INTERSTATE GAS CO.
PACIFIC GAS & ELECTRIC CO.
SOUTHERN CALIFORNIA GAS CO.
EL PASO NATURAL GAS CO.
SPOKANE
SEATTLE
TACOMA
PORTLAND
VANCOUVER
VICTORIA
SALT LAKE CITY
DENVER
SAN FRANCISCO
LOS ANGELES
SAN DIEGO
PHOENIX
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